THE
MADREPORARIA OF THE SIBOGA EXPEDITION

PART II

MADREPORARIA FUNGIDA

Siboga-Expeditie
XVIb

THE MADREPORARIA OF THE SIBOGA EXPEDITION

PART II

MADREPORARIA FUNGIDA

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INTRODUCTION.

About three years ago Professor WEBER suggested that I should examine the corals collected under his guidance in the East-Indian Archipelago by the Siboga Expedition. Although I had never studied corals before, I thought I could not decline the honour which was offered me. The material brought home by the Siboga Expedition is very great indeed and it was at once evident that its examination would have all kinds of important systematic results. I should like to thank Prof. WEBER very much for having given me this opportunity.

I have not however restricted myself to the study of the corals of the Siboga Expedition. In the Museum of the Royal Zoological Society "Natura Artis Magistra" at Amsterdam there is a very large collection of corals, which have not hitherto been sufficiently studied. The same can be said of the large collection in "'s Rijks Museum voor Natuurlijke Historie" at Leiden. Both of these collections were also handed to me to examine, for which I feel extremely grateful to Dr. KERBERT, the director of the Society N. A. M. and to Prof. VAN OORT, the director of the Leiden Museum.

As a matter of fact these corals too came from the East-Indies for the most part. There are however, especially in the Leiden Museum, several specimens from other localities, sothat in this paper all the Indo-Pacific corals from both the Museums are mentioned, with the exception of the Deep-Sea Madreporaria of the Siboga Expedition which were previously examined by ALCOCK [1]).

It is customary, and also systematically right to begin with the *Madreporaria imperforata*. The reason for which I deviated from this course and first of all studied the *Fungida* is that as a beginner in this sphere I made a beginning with the part that seemed the easiest to me.

The fact that there is an excellent monograph by Prof. DÖDERLEIN on the genus *Fungia* was an additional reason for examining this genus first.

1) ALCOCK has partially studied the solitary Madreporaria of the propre-littoral zone. A report on them announced by ALCOCK, has never been published sothat these corals too will be discussed in this report.

I have discussed also in this report the genus *Merulina* of which the systematic position is doubtfull.

The corals of the Siboga Expedition had lain packed in cotton for nearly twenty years. This cotton appeared to have been a very attractive abode for mice with the sad consequence that several labels have disappeared, the numbers of the stations of these corals are therefore unknown.

The species marked * were not collected by the Siboga Expedition. There is in each case an indication against specimens received from the Leiden Museum; the others belong to the Museum at Amsterdam.

LIST OF RECORDED SPECIES.

MADREPORARIA FUNGIDA.

Fam. Fungiidae:

Fungia patella (Ellis et Sol.).
Fungia erosa Död.
Fungia somervillei Gardiner.
Fungia cyclolites Lam.
Fungia elegans Verrill.
Fungia sibogae nov. spec.
Fungia adrianae nov. spec.
Fungia moluccensis van der Horst.
Fungia actiniformis Q. et G.
Fungia paumotensis Stutchbury.
Fungia scutaria Lam.
Fungia weberi nov. spec.
Fungia proechinata Död.
Fungia echinata (Pallas).
Fungia granulosa Klunzinger.
Fungia scabra Död.
Fungia concinna Verrill.
Fungia repanda Dana.
Fungia acutidens Studer.
Fungia klunzingeri Död.
Fungia danai M.-Edw. et H.
Fungia scruposa Klunzinger.
Fungia fungites (L.).
Herpolitha limax (Esper.).
Polyphyllia talpina (Lam.).
Döderleinia robusta (Quelch).
Döderleinia irregularis Gardiner.
Döderleinia sluiteri nov. spec.
Halomitra pileus Dana.
Halomitra tiara Agassiz.
Halomitra louwinae nov. spec.

Fam. Agariciidae.

Pavona lata Dana.
Pavona decussata Dana.
Pavona danai (M.-Edw. et H.).
Pavona cactus (Forsk.).
Pavona frondifera Lam.
Pavona divaricata Lam.
Pavona praetorta Dana.
Pavona varians Verrill.
Pavona diffluens (Lam.).
Podabacia crustacea (Pallas).
Podabacia involuta nov. spec.
Podabacia lobata nov. spec.
Podabacia dispar Verrill.
Podabacia elegans (M.-Edw. et H.).
Leptoseris gardineri nov. nomen.
Leptoseris papyracea (Dana).
Leptoseris tubulifera Vaughan.
Leptoseris hawaiiensis Vaughan.
Leptoseris fragilis M.-Edw. et H.
Leptoseris incrustans Gardiner.
Leptoseris tenuis nov. spec.
Siderastrea savignyana M.-Edw. et H.

Psammocora contigua (Esper).
Psammocora divaricata Gardiner.
Psammocora planipora M.-Edw. et H.
Psammocora exesa Dana.
Psammocora haimeana Rousseau.
Psammocora nierstraszi nov. spec.
Pachyseris speciosa (Dana).
Pachyseris levicollis (Dana).
Pachyseris involuta Studer.
Pachyseris valenciennesi M.-Edw. et H.
Pachyseris rugosa (Lam.).
Pachyseris carinata Brüggemann.
Pachyseris torresiana Vaughan.
Pachyseris spec.
Bathyactis palifera Alcock.

Genus not referred to any family.

Merulina ampliata (Ellis et Sol.).
Merulina vaughani nov. nomen.
Merulina regalis Dana.
Merulina ramosa M.-Edw. et H.
Merulina studeri Bedot.

SYSTEMATICAL ACCOUNT.

FUNGIIDAE.

Fungia Lamarck.

Besides a number of very young specimens, that were not to be determined, I had at my disposal more than 380 specimens of this genus. Of this number more than 150 were collected by the Siboga Expedition.

Thanks to DÖDERLEIN's excellent monograph the identification of the species of the genus *Fungia* is not such a difficult matter as that of other genera of corals is. The literature published before DÖDERLEIN's monograph (1902) is therefore not mentioned here again.

1. *Fungia patella* (Ellis et Solander). (Plate I, fig. 1).

Fungia patella Döderlein 1902.
Fungia patella Vaughan 1907.
Fungia patella Gardiner 1909.
Fungia patella Gravier 1911.

Stat. 33. Bay of Pidjot, Lombok. 6 ex.
Stat. 43. Anchorage of Pulu Sarassa, Postillon-islands. Numerous ex.
Stat. 47. Bay of Bima. 1 ex.
Stat. 64. Kambaragi-bay, Tanah Djampeah. 3 ex.
Stat. 96. South-east side of Pearl-bank, Sulu-archipelago. 2 ex.
Stat. 99. Anchorage of North-Ubian. 25 ex.
Stat. 104. Sulu-harbour, Sulu-island. 4 ex.
Stat. 144. Anchorage North of Salomakiëe-(Damar)-island. 1 ex.
Stat. 153. Lat. 0° 3'.8 N., Long. 130° 24.3 E. 1 ex.
Stat. 164. Anchorage near Seget, West entrance Selee-(Galewo-)strait. 2 ex.
Stat. 209. Anchorage of the South-point of Kabaëna-island. 1 ex.
Stat. 231. Ambon-anchorage. 5 ex.
Stat. 240. Banda-anchorage. 12 ex.
Stat. 260. 2.3 miles N., 63° W. from the North-point of Nuhu Jaan, Kei-islands. Depth 90 meters. 3 ex.
Stat. 285. Anchorage South coast of Timor. 1 ex.
Stat. 311. Sapeh-bay, East coast of Sumbawa. 1 ex.
Stat. 313. Anchorage East of Dangar Besar, Saleh-bay. 1 ex.
Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 6 ex.
Timor. WIENECKE leg. Mus. Leiden 1 ex. — Locality unknown 1 ex.

Among the nearly 100 specimens of *F. patella*, that I had before me there were both *Diaseris*- and *Cycloseris*-forms in great number. But among these there is so much variation that a further discussion is desirable.

Numerous specimens have the aboral surface flat, the oral surface somewhat arched. Costae provided with minute spines, extending to the centrum. The septa are strongly granulated; at the edge of the corallum all are equal in height. In young specimens the scar of attachment is always obvious.

Other specimens are very thin, with under surface hollow. Costae recognisable at the edge of the corallum; centrum irregularly covered with fine granulations; all around the axial fossa the septa increase in height. The edges of the septa are very finely but irregularly toothed; vertical rows of grains present. The 3 *Cycloseris*-forms of Stat. 315 have both surfaces flat. Two of these specimens have the ribs obvious only at the edge of the corallum, the centrum of the under surface being irregularly covered with fine granulations. The septa of these two specimens are equal in height and very much grained. They have the appearance of *F. patella* var. *filigrana* Död. In the third specimen (dimensions 52 × 52 m.M.) the ribs reach the centrum, the scar of attachment is here obvious. The edge of the corallum is slightly undulating.

Seven specimens from Stat. 240 are remarkable and very charming, as the edge of the corallum undulates strongly (Plate I, fig. 1). In all other respects they agree with *F. patella*. However peculiar and remarkable this undulation may be, it is not a sufficient justification for separating these specimens from *F. patella*, especially as the above mentioned specimen from Stat. 315 also has a slightly undulating edge, while in all these 7 specimens from Stat. 240 the undulation is not equally strong.

2. *Fungia erosa* Döderlein.

Fungia erosa Döderlein 1902.

Stat. 282. Anchorage between Nusa Besi and the N. E. point of Timor. 1 ex.

This specimen corresponds in every respect with DÖDERLEIN's *F. erosa*, only the colour of the centrum of the under surface is not differentiated. I have only one specimen of this species and this specimen is very distinct from *F. patella*. So I cannot decide if VAUGHAN and GARDINER are correct in absorbing *F. erosa* in *F. patella*.

3. *Fungia somervillei* Gardiner. (Plate I, fig. 2).

Fungia Somervillei Gardiner 1909.

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

A beautiful specimen of this species was collected by the Siboga Expedition. The length is 125 m.M., the breadth 72 m.M., so this specimen is more elongate than those of GARDINER, one of which is of the same length and 98 m.M. in breadth. The corallum is thin (± 7 m.M.) only all around the axial fossa increases in thickness up to 20 m.M.; wall imperforate; the costae are low, those of first cycles slightly higher with very small blunt spines. In this specimen

it is impossible to say whether the ribs reach the centrum, because it is covered with serpulids. Septa unequal in height; septa of higher cycles fused to those of the next lower cycle, after such fusion the septa of the lower cycle gradually increasing in height; septa of the first cycles thickened towards the mouth; the edge of the septa with minute teeth (about 25 in 1 c.M.) with deep incisions between them; teeth often irregular; sides of the septa densely and finely grained. According to GARDINER these grains must run into lines perpendicular to the edges of the septa, where they end in the teeth. In the specimen of the Siboga Expedition these lines of grains can only be seen occasionally here and there.

The axial fossa is 22 m.M. long.

4. *Fungia cyclolites* Lam. (Plate II, fig. 5).

Fungia cyclolites Döderlein 1902.
Cycloseris cyclolites Gardiner 1905.
Fungia cyclolites Bedot 1907.
Fungia cyclolites Gardiner 1909.
Fungia cyclolites Gravier 1911.

Stat. ? 1 ex.
Billiton. TEYSMAN leg. 2 ex. Mus. Leiden. — Amboina. LUDEKING leg. 1 ex. Mus. Leiden. — Moluccos 1 ex. — Locality unknown. 7 ex.

The specimen of the Siboga Expedition differs with respect to the ribs from DÖDERLEIN's description of the species. According to DÖDERLEIN the ribs must be very fine and low. But in this specimen the costae are pretty high and densely packed and show towards the centrum slight undulations as may be seen on the figure. All costae equal in height and provided with very minute spines. So in this respect this specimen corresponds more with *F. costulata*. But in every other the specimen agrees exactly with the description of *F. cyclolites*, so that I think it is best to regard it as a variety of this species. All my other specimens are typical forms of *F. cyclolites*.

*5. *Fungia elegans* Verrill.

Fungia elegans Döderlein 1902.

The Gulf of California. Dr. H. TEN KATE leg. 4 ex. Mus. Leiden.

6. *Fungia sibogae* nov. spec. (Plate I, fig. 3, 4).

Stat. ? 1 ex.

Corallum somewhat oval in shape, thick, heavy, imperforate; aboral surface slightly hollowed; upper surface rising from the edge to the centrum. Edge of the corallum rounded; centrum of the under surface with a few small indistinct grains, almost entirely flat; ribs forming lamellae that become more indistinct towards the centrum; costae of first cycles very little prominent. The spines minute, not visible with the naked eye; septa of first cycles throughout their entire length higher than those of higher cycles; the septa of the two highest cycles fused to those of lower cycles; septa of first cycles thickened with many minute grains and throughout their entire length with rounded edge; axial fossa very narrow.

The length of the only specimen of this species, that I had before me, is 88 m.M., the breadth 82 m.M., the height 40 m.M.. The greatest thickness of the corallum is 31 m.M. and the length of the axial fossa 23 m.M. On the upper surface two little secondary calices are visible.

This species looks in general much like *F. cyclolites* but differs from it because the costae don't reach the centrum, the septa are unequal in height and the edges of the septa are rounded.

*7. *Fungia adrianae* nov. spec. (Plate II, fig. 6, 7).

Locality unknown. 1 ex.

Corallum somewhat oval in shape, thick, imperforate. Underside slightly concave, upper surface arched, increasing in thickness towards the centrum. Edge of the corallum rounded; ribs all equal in height, forming very meandering lamellae that are higher than one m.M. near the edge, but lower towards the centrum. The meandering of the ribs is more marked towards the centrum. Each lamella is interrupted by narrow incision; so that it consists of a number ot pieces lying one behind the other. These pieces decrease in length towards the centrum. Owing to their very marked meandering no separate ribs can be recognised here. The spines on the ribs are very minute. The septa of first order are thickened towards the mouth, where the edge is rounded, whereas at the periphery the edge is sharp. The bigger septa are throughout their whole length rather higher than those of a lower order. The smaller septa suddenly get lower towards the centrum, but don't anastomose; they sometimes have tentacular lobes. The have minute triangular little teeth; the granulation is not obvious. The rows of granulations septa are well developed.

The only specimen of this species that I had before me, was 86 m.M. long, 76 m.M. broad and 36 m.M. high. Its greatest thickness 28 m.M. Length of the axial fossa 33 m.M.

Place of origin unknown, probably the indo-australian Archipelago.

*8. *Fungia moluccensis* van der Horst. (Plate II, fig. 1, 2).

Fungia granulosa Vaughan 1906.
Fungia moluccensis van der Horst 1919.

Moluccos REINWARDT leg. Leiden Mus. 1 ex. — Locality unknown. Leiden Mus. 1 ex.

Corallum oval in shape, heavy; wall with a few slits near the periphery, otherwise solid; aboral surface concave; margin of the corallum rounded; upper surface much arched round the axial fossa, equally thick, all along the edge; central area of the under surface densely granulated; ribs only distinct at the periphery, unequal. The larger ones extend farther towards the centrum; in the central area they continue for some distance like rows of granulations. All ribs are densely granulated and provided with short irregular spines. Septa unequal; those of the higher cycles fuse together; the smaller septa with minute teeth, between which deep, often overbridged incisions; edges of the larger septa irregular, very densely granulated, on which account these septa seem thicker than they are in reality. The sides of the septa do not show many granulations.

I have before me two specimens of this species. One was collected by Prof. REINWARDT in the Moluccos: the origin of the other is unknown.

Dimensions of the specimens in m.M.:

Locality	length	height	breadth	thickness round the axial fossa	thickness at the edge	length of axial fossa.
Moluccos	106	47	92	29	13	25
unknown	150	55	108	35	15	40

In the large figured specimen the thicker ribs are more prominent than in the other.

This species greatly resembles *Fungia oahensis* Död., but differs from it in the absence of the swellings in the central area of the under surface, and in the inequality of the septa and ribs. The specimen that VAUGHAN (1906) describes and figures as *Fungia granulosa* is in my opinion not *Fungia granulosa* but *F. moluccensis*. I have before me an indubitable specimen of *F. granulosa*; I have also seen two specimens in the British Museum (Natural History) in London and the difference between the two species is too striking to leave any doubt.

The specimen from the Moluccos shows on the upper surface two little secondary calycles.

9. *Fungia actiniformis* Quoy et Gaimard.

Fungia actiniformis Döderlein 1902.
Fungia actiniformis Bedot 1907.

Stat. 93. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. 16 ex.
Stat. 100. Anchorage of North-Ubian. Depth 450 meters. 1 ex.
Stat. 114. Kwandang-bay-entrance. Depth 72 meters. 1 ex.
Stat. 115. East side of Pajunga-island. Kwandang-bay. 1 ex.
Locality unknown. 2 ex.

The specimens of the Siboga Expedition are preserved in formol, sothat the soft parts have been well preserved. One of these specimens is a double monster with two mouths.

*10. *Fungia paumotensis* Stutchbury.

Fungia paumotensis Döderlein 1902.
Fungia paumotensis Bedot 1907.
Fungia paumotensis Vaughan 1907.

Amboina. LUDEKING leg. Leiden Mus. 1 ex. — Moluccos. REINWARDT leg. Leiden Mus. 1 ex. — Locality unknown. 6 ex.

Fungia paumotensis var. *carcharias* Studer.

Moluccos. REINWARDT leg. Leiden Mus. 1 ex. — Locality unknown. 2 ex.

11. *Fungia scutaria* Lam.

Fungia scutaria Döderlein 1902.
Fungia dentigera Gardiner 1905.
Fungia scutaria Vaughan 1907.
Fungia scutaria Gardiner 1909.
Fungia scutaria Vaughan 1918.

Stat. 93. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu-archipelago. 2 ex.
Stat. ? 1 ex.
Stat. ? 1 ex.
Moluccos. VAN DER HUCHT leg. 1 ex. — Red Sea. Leiden Mus. 2 ex. — Locality unknown. 5 ex.

12. *Fungia weberi* nov. spec. (Plate I, fig. 5, 6).

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 2 ex.

The coral is elongate, thin and fragile, sothat both specimens are broken. Of one specimen I have only a part. Both specimens have also been broken when alive and have regenerated again, sothat one is linguiform now. The long axis is bent aside and the tip is lifted up.

The cross-section is arched. At the tip the axial fossa is not distinctly defined. In the middle of the axial fossa there runs a septum from the tip; this septum is 5,4 c.M. long, but is interrupted three times by the columella.

The trabecular columella is more strongly developed and higher at certain points than at others.

In the one specimen there are 16 of these points, in the broken one there are six. At each point of increase in the columella there have fused two septa, which project a little more than usual towards the centrum. These septa are not always of the same order.

The corallum shows numerous minute perforations. The edge of the corallum is rounded. The ribs are developed as minute low lines with very small blunt spines. The ribs of the first order reach the middle of the coral, but along the edge they cannot be distinguished from those of lower orders. The septa are nearly equally high, those of the higher order are very thin and fused with each other. The septa are covered with a few grains and have very minute irregular small teeth along the edge.

The length of one of the specimens is 188 m.M., the axial fossa is 168 m.M. long, the greatest breadth is 45 m.M. and the greatest thickness 5 m.M. The broken one is 78 m.M. long and 59 m.M. broad.

13. *Fungia proechinata* Död.

Fungia proechinata Döderlein 1902.

Stat. 301. Pepela-bay, East coast of Rotti-island. Dredged in 27—45 M. 1 ex.

The only specimen of the species agrees closely with DÖDERLEIN's description. It is also easily distinguished from a young *Fungia echinata*. The length is 72 m.M., the breadth 50 m.M.; the length of the axial fossa 15 m.M.

14. *Fungia echinata* (Pallas).

Fungia echinata Döderlein 1902.
Fungia echinata v. Marenzeller 1906.
Fungia echinata Bedot 1907.
Fungia echinata Vaughan 1907.
Fungia echinata Gardiner 1909.
Fungia echinata Gravier 1911.

Stat. 60. Haingsisi, Samau-island, Timor. 1 ex.
Stat. 213. Saleyer-anchorage. 2 ex.
Stat. 299. Buka- or Cyrus-bay, South coast of Rotti-island. Dived to a depth of 34 M. 1 ex.
Stat. 303. Haingsisi, Samau-island. 1 ex.
Stat. ? 1 ex.
Moluccos. REINWARDT leg. Leiden Mus. 6 ex. — Djeddah. Leiden Mus. 1 ex. — Amboina. Leiden Mus. 1 ex. — Red Sea. Leiden Mus. 1 ex. — Singapore. 1 ex. — Moluccos. VAN DER HUCHT leg. 2 ex. — Billiton. 1 ex. — Locality unknown. 13 ex.

The specimen from Stat. ? is tripartite. One of the specimen from the Moluccos collected by Prof. REINWARDT has broken into two parts; both pieces are separately regenerated, it is obvious that they once belonged to each other.

The specimen from Stat. 60 is characterized as the variety *parvispina* Död. by the possession of very short spines (Plate I, fig. 7).

*15. *Fungia granulosa* Klunzinger. (Plate I, fig. 8).

Fungia granulosa Döderlein 1902.
Fungia granulosa v. Marenzeller 1906.
Fungia granulosa Gardiner 1909.

Larantuka. Dr. J. SEMMELINK leg. Leiden Mus. 1 ex.

Corallum not very thick; upperside arched; underside quite flat; theca perforated and very densely covered with blunt very rough spines; septa very densely covered with grains.

By these characters this specimen is immediately recognised as *Fungia granulosa*. Hitherto this species was only known from the Red Sea. This specimen was found at Larantuka, Celebes. The length is 86 m.M., the breadth 84 m.M., the thickness 20 m.M.

16. *Fungia scabra* Döderlein.

Fungia scabra Döderlein 1902.

Stat. 115. East side of Pajunga-island. Kwandang-bay. 1 ex.
Stat. 213. Saleyer-anchorage. 1 ex.
Puluh-Weh. P. BUITENDIJK leg. Leiden Mus. 1 ex. — Billiton. 1 ex. — Locality unknown. 3 ex.

In the specimen from Stat. 213 the principal septa are thickened a little, while DÖDERLEIN says, that the septa are thin. The specimen from Pulu-Weh has rather strong tentacular lobes.

This specimen has been regenerated from a sector in the same way as *Fungia oahensis* in DÖDERLEIN's figure (Plate 9, fig. 5).

The specimen of the Siboga Exp. is 55 m.M. long, 55 m.M. broad and 23 m.M. high, so it is much smaller than DÖDERLEIN's specimens.

17. *Fungia concinna* Verrill.

Fungia concinna and *F. plana* Döderlein 1902.
Fungia plana v. Marenzeller 1906.
Fungia concinna Vaughan 1906.
Fungia concinna Gardiner 1909.
Fungia plana and *F. concinna* Gravier 1911.
Fungia aff. *F. concinna* Vaughan 1918.

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 9 ex.
Stat. ? 2 ex.
Stat. ? 2 ex.
Amboina. HOEDT leg. Leiden Mus. 1 ex. — Billiton. 4 ex. — Locality unknown. 9 ex.

I entirely agree with GARDINER's view that both species *Fungia plana* and *F. concinna*, which DÖDERLEIN distinguishes, must be united in one species, *Fungia concinna*, on the score of the numerous transitions. The specimens of the Siboga Expedition agree exactly with each other in general form. They all have a flat, thin corallum with small spines on the under surface, just as DÖDERLEIN's figure of *Fungia plana*. They have nearly all, however, rather large teeth on the septa from 5 to 8 in 1 c.M., just as in *F. concinna* Döderlein. A specimen from Stat. ? has 14 teeth in 1 c.M. and a specimen from Stat. 315 has 17 teeth in 1 c.M. The last mentioned specimen, measuring 92 × 81 m.M. and 11 m.M. thick, has an obvious scar of attachment, it has lamelliform ribs with very minute spines. The above mentioned specimen from Stat. ? stands between DÖDERLEIN's species *F. plana* and *F. concinna* as regards the number of teeth. This is also the case with the specimen from Amboina with 13 teeth to 1 c.M. The specimens of unknown origin have in general a thicker corallum and coarser, longer spines than those of the Siboga Exp., they have however finer teeth, 15 to 21 in 1 cM. There are however some among them which have less than 10 spines to 1 c.M., so these agree with DÖDERLEIN's description of *F. concinna*. Further there are among those with fine teeth some which have imperforated walls and among those with coarser teeth some which don't show perforations. With *Fungia fungites* Döderlein had the same difficulties. At first he advocated making two species of it, namely *F. fungites* and *F. dentata* on account of the difference in size of the teeth, but he altered his opinion afterwards (see pag. 145 and 146). Though the extreme forms exhibit differences as great as those that may be expected of different species and agree undoubtedly with DÖDERLEIN's descriptions of *F. plana* and *F. concinna*, there exist however such obvious transitions in the size of the spines, the thickness of the corallum, the presence or absence of the perforations and the nature of the teeth, that it is preferable to regard both species of DÖDERLEIN as synonyms of *Fungia concinna* Verrill.

18. *Fungia repanda* Dana.

Fungia repanda Döderlein 1902.
Fungia repanda Bedot 1907.
Fungia repanda Gardiner 1909.

Stat. 50. Bay of Badjo, West coast of Flores. 2 ex.
Stat. 61. Lamakera, Solor-island. 1 ex.
Stat. 78. Lumu-Lumu-shoal, Borneo-bank. 1 ex.
Stat. 213. Saleyer-anchorage. 2 ex.
Stat. 299. Buka- or Cyrus-bay, South coast of Rotti-island. Dived to a depth of 34 M. 2 ex.

East coast of Banka. VAN DEN BOSSCHE leg. Leiden Mus. 1 ex. — Singapore. BOTTEMANNE leg. 1 ex. — Red Sea. Leiden Mus. 6 ex. — Larantuka. Dr. J. SEMMELINK leg. Leiden Mus. 3 ex. — Amboina. HOEDT leg. Leiden Mus. 3 ex. — Moluccos. REINWARDT leg. Leiden Mus. 1 ex. — Macassar. HELLINGS leg. 1 ex. — Billiton. 14 ex. — Locality unknown. 22 ex.

The specimen from Stat. 78 measures 49 × 48 m.M. These from Stat. 213, 38 × 37 m.M.

and 29 × 25 m.M., have an obvious scar of attachment. A specimen of unknown origin possesses an obvious stalk notwithstanding its rather large size (99 × 90 m.M.).

Three specimens (two of unknown origin and one from Singapore) have two mouths. This is probably the result of an unsuccessful attempt at regeneration. On the specimen from Singapore the one half partly overgrows the other. Two specimens of unknown origin which probably belong to this species are quite abnormal. Though they have diameters of 125 and 150 m.M., they are 80 and 105 m.M. high. The smaller specimen has two mouths. On the larger specimen the centrum has died and is damaged, while all around several secondary mouths have developed.

The specimens from the Red Sea are undoubtedly *F. repanda*, and the locality, Red Sea, can be vouched for. Ceylon is mentioned by the authors except EHRENBERG as being the most western limit of this species.

*19. *Fungia acutidens* Studer.

Fungia acutidens Döderlein 1902.
Fungia acutidens Gardiner 1909.

A specimen of unknown locality 60 m.M. long and 60 m.M. broad must be attributed to this species in my opinion, notwithstanding the absence of the rows of granulations under the teeth. In every other respect this specimen agrees with DÖDERLEIN's description.

*20. *Fungia klunzingeri* Döderlein.

Fungia klunzingeri Döderlein 1902.

A specimen of unknown locality measuring 98 × 107 m.M. agrees entirely with DÖDERLEIN's description.

21. *Fungia danai* M.-Edw. et H.

Fungia danai Döderlein 1902.
Fungia danai Gardiner 1905.
Fungia danai Bedot 1907.
Fungia danai Gardiner 1909.

Stat. 213. Saleyer-anchorage. 1 ex.
Singapore. 1 ex. — St. Pierre. Leiden Mus. 1 ex. — Billiton. 1 ex. — Locality unknown. 10 ex.

*22. *Fungia scruposa* Klunzinger.

Fungia scruposa Döderlein 1902.
Fungia scruposa v. Marenzeller 1906.

Moluccos. Leiden Mus. 2 ex.

Both specimens are arched. One specimen has rather regular teeth; so it can be reckoned as the var. *ternatensis* Döderlein.

23. *Fungia fungites* (L.).

Fungia fungites Döderlein 1902.
Fungia fungites Gardiner 1905.
Fungia fungites v. Marenzeller 1906.
Fungia fungites Bedot 1907.
Fungia fungites Gardiner 1909.
Fungia fungites Gravier 1911.
Fungia fungites Vaughan 1918.

Stat. 60. Haingsisi, Samau-island, Timor. 1 ex.
Stat. 115. East side of Pajunga-island, Kwandang-bay. 1 ex.
Stat. 193. Sanana-bay, East coast of Sula Besi. 1 ex.
Stat. 219. About 5 miles Southwest of Binongka-island. 1 ex.
Stat. 220. Anchorage off Pasir Pandjang, West coast of Binongka. 1 ex.
Stat. 282. Anchorage between Nusa Besi and the N. E.-point of Timor. 1 ex.
Stat. 301. Pepela-bay, East coast of Rotti-island. Dredged in 27—45 M. 4 ex.
Stat. ? 2 ex.

Timor. WIENECKE leg. Leiden Mus. 1 ex. — Samoa-islands. W. VON BÜLOW leg. Leiden Mus. 3 ex. — Djeddah. J. A. KRUYT leg. Leiden Mus. 3 ex. — Moluccos. REINWARDT leg. Leiden Mus. 2 ex. — East coast of Banka. VAN DEN BOSSCHE leg. Leiden Mus. 1 ex. — Java. JUNGHUHN leg. Leiden Mus. 3 ex. — Amboina. LUDEKING leg. Leiden Mus. 1 ex. — Pulu-Weh. P. BUITENDIJK leg. Leiden Mus. 2 ex. — Sangir-islands. SCHRÖDER leg. Leiden Mus. 3 ex. — Billiton. 6 ex. — Nossi-Bé. Madagascar. POLLEN and VAN DAM. leg. Leiden Mus. 1 ex. — Red Sea. Leiden Mus. 16 ex. — Locality unknown. 33 ex.

To facilitate the recognition of this very variable species DÖDERLEIN distinguishes a number of forms, which he describes as varieties. The larger part of his specimens DÖDERLEIN cannot, however, assign to any one of these varieties. They form transitions between the different varieties. The existence of all possible transitions made GARDINER cease to recognize DÖDERLEIN's varieties. It seems to me however more practical to maintain the varieties.

Of the 67 specimens, that I had before me, I could recognize a number as belonging to one or other of the varieties, but with the larger part this was not the case.

Fungia fungites var. *haimei* Verrill.

The specimens from Stat. 220 (83 × 68 m.M.) and from Stat. 282 (54 × 48 m.M.) belong to the variety *haimei*. To the same variety there belong also two specimens of unknown locality, measuring 77 × 79 m.M. and 67 × 63 m.M. respectively. These are all young specimens. The one from Stat. 282 also has a scar of attachment; DÖDERLEIN's supposition, that the variety *haimei* is only a young form, is right, I think.

Fungia fungites var. *discus* Dana.

To the var. *discus* I assign one of the specimens from Stat. 301 (97 × 88 m.M.). From the other stations I did not find any representative of this variety.

Fungia fungites var. *incisa* Döderlein.

Two specimens of unknown locality agree entirely with the description of the var. *incisa*.

Fungia fungites var. *dentata* Dana.

Java. JUNGHUHN leg. 1 ex. — Moluccos. REINWARDT leg. 1 ex. — Djeddah. KRUYT leg. 1 ex. — Samoa-islands. VON BÜLOW leg. 2 ex. — Locality unknown. 4 ex.

Fungia fungites var. *agariciformis* Lam.

Djeddah. KRUYT leg. 1 ex.

Fungia fungites var. *confertifolia* Dana.

Stat. 60. Haingsisi, Samau-Island, Timor. 1 ex.
Stat. 193. Sanana-bay, East coast of Sula Besi. 1 ex.
Stat. 219. About 5 miles southwest of Binongka-island. 1 ex.
Stat. 301. Haingsisi, Samau-island. 3 ex.
Stat. ? 2 ex.
Amboina. LUDEKING leg. 1 ex. — Locality unknown. 4 ex.

Fungia fungites var. *stylifera* Döderlein.

Locality unknown. 2 ex.

Herpolitha Eschscholtz.

Herpolitha limax (Esper).

Madrepora pileus Ellis et Solander 1786.
Madrepora pileus Pallas 1787.
Madrepora limax Esper 1797.
Fungia limacina Lamarck 1801, 1816, 1836.
Fungia limacina Blainville 1830, 1834.
Haliglossa interrupta Ehrenberg 1832.
Haliglossa limacina Ehrenberg 1832.
Haliglossa foliosa Ehrenberg 1832.
Haliglossa stellaris Ehrenberg 1832.
Herpetolithus limacinus Dana 1846.
Herpetolithus interruptus Dana 1846.
Herpetolithus stellaris Dana 1846.
Herpetolithus strictus Dana 1846.
Herpetolithus crassus Dana 1846.
Herpetolitha limax M.-Edwards 1860.
Herpetolitha limax Verrill 1864.
Herpolitha foliosa Klunzinger 1879.
Herpolitha limax Duncan 1886.
Herpetolitha crassa Quelch 1886.
Herpetolitha limax Ortmann 1888.
Herpetolitha limax Ortmann 1889.
Herpolitha crassa Gardiner 1898.
Herpolitha foliosa v. Marenzeller 1906.
Herpetolitha limax Bedot 1907.
Herpolitha foliosa Gardiner 1909.
Herpolitha limax Gardiner 1909.
Herpolitha crassa Gardiner 1909.
Herpetolitha foliosa Gravier 1911.

Herpetolitha crassa Vaughan 1918.
Herpetolitha stricta Vaughan 1918.
Herpetolitha limax Vaughan 1918.

Stat. 213. Saleyer-anchorage. 3 ex.
Stat. ? 1 ex.
Moluccos. VAN DER HUCHT leg. 15 ex. — Amboina. HOEDT leg. Leiden Mus. 3 ex. — Red Sea. Leiden Mus. 1 ex. — Mauritius. 1 ex. — Billiton. 1 ex. — Moluccos. 1 ex. — Sabang, Sumatra. HERMANS leg. 1 ex. — Locality unknown. 16 ex.

I agree with MILNE-EDWARDS and ORTMANN, that all these described species of *Herpolitha* are only different forms of one species. Among the rather extensive material, that I examined, there were specimens, which agree perfectly with the descriptions of the different species and which agree entirely with GARDINER's specimens, that I have seen. But between these forms there are all possible transitions. Some specimens look on one side like *H. foliosa* or *H. limax*, but have on the other side the starlike mouths of *H. crassa*. These transitions are principally between *H. foliosa* and *H. crassa* and between *H. limax* and *H. crassa*, and fewer between *H. foliosa* and *H. limax*. It is a matter of fact that this species has a right to the name of *Herpolitha pileus* (Ellis et Solander): The figure and description of ELLIS and SOLANDER don't leave any doubt.

Polyphyllia Quoy et Gaimard.

GARDINER has treated this genus extensively, and has shown that *Cryptabacia* and *Lithactinia* are synonymous with *Polyphyllia*. Under these three names several species have generally been described unsufficiently. *Lithactinia pileiformis* (Dana) Quelch and *Lithactinia galeriformis* (Dana) Quelch, which I saw in the British Museum are however specifically different from *Polyphyllia talpina*; they do undoubtedly belong to the genus *Polyphyllia*.

I was able to examine 26 specimens of this genus. In my opinion they all belong to one very variable species.

1. *Polyphyllia talpina* (Lam.).

Fungia talpina Lamarck 1801.
Polyphyllia pelvis Quoy et Gaimard 1833.
Fungia talpa Lamarck 1836.
Polyphyllia talpa Dana 1846.
Cryptabacia talpina M.-Edwards et Haime 1851.
Cryptabacia talpina M.-Edwards 1860.
Cryptabacia talpina Verrill 1864.
Cryptabacia talpina Quelch 1886.
Cryptabacia talpina Duncan 1886.
Polyphyllia talpa Ortmann 1888.
Polyphyllia talpina Gardiner 1909.
Polyphyllia talpina Vaughan 1918.

Stat. 213. Saleyer-anchorage. 4 ex.
Stat. 258. Tual-anchorage, Kei-islands. 2 ex.
Stat. 261. Elat, West coast of Great-Kei-island. 2 ex.

Stat. 273. Anchorage off Pulu Jedan, East coast of Aru-islands (Pearl-banks). 2 ex.
Stat. 279. Rumah Kuda-bay, Roma-island. 1 ex.

Larantuka. Dr. J. SEMMELINK leg. Leiden Mus. 1 ex. -- Amboina. HOEDT leg. Leiden Mus. 1 ex. — Amboina. LUDEKING leg. Leiden Mus. 1 ex. — Bay of Bongu, Sumatra. MULLER leg. Leiden Mus. 1 ex. — Java Sea. BUITENDIJK leg. Leiden Mus. 1 ex. — Moluccos. REINWARDT leg. Leiden Mus. 1 ex. — Japan. 1 ex. — Billiton. 4 ex. — Locality unknown. 14 ex.

In this species there are very different forms, which at first sight could be regarded as different species. The extremes are connected however by all kinds of intermediate forms. The general form of the colony varies between very long and narrow and nearly circular. The degree of arching also varies considerably. There are nearly flat specimens and also those which are so very much arched, that the edges nearly meet each other. In the narrower specimens and also in younger colonies the axial furrow is generally easy to see, but in short, broad specimens the primary axial furrow degenerates and can even disappear altogether. The form of the secondary calicles is often, even in one and the same specimen, subject to great variation. At one extreme several septa may meet, so that the calicle is clearly star shaped, while at the other the calicle is formed by two principal septa only.

The thickness of the septa varies too. The principal septa may be as much as two m.M. thick; the secondary septa generally are much thinner. In one of the specimens from Stat. 273 the secondary septa are however as broad as the principal septa, while in certain other specimens this is also the case only to a lesser degree. The principal septa have irregular teeth and are densely granulated. On the secondary septa there are much fewer grains. On the under side the spines are only in rows at the edge of the corallum; in the middle they are irregularly scattered. The spines are short and blunt and covered with granulations. The wall does not show many perforations.

Döderleinia Gardiner.

In 1909 GARDINER separated two species which were formerly reckoned as belonging to the genus *Halomitra* and made for them a new genus *Döderleinia*. Though they are closely related to *Halomitra*, what is shown especially when a third new species, collected by the Siboga Expedition is taken into account yet there are differences which may justify the separation into two genera. The principal characters by which *Döderleinia* is distinguished from *Halomitra*, are the rough somewhat arborescent spines and the extraordinarily strong granulation on the upper- as well as on the underside.

1. *Döderleinia robusta* (Quelch). (Plate IV, fig. 1).

Podabacia robusta Quelch 1886.
Podabacia robusta Studer 1901.
Podabacia robusta Bedot 1907.
Döderleinia robusta Gardiner 1909.

Stat. 303. Haingsisi, Samau-island. 1 ex.
Moluccos. VAN DER HUCHT leg. 6 ex. — Moluccos. REINWARDT leg. Leiden Mus. 1 ex. — Japan. 1 ex. — Torres-straits. H. A. WARD leg. Leiden Mus. 1 ex. — Locality unknown. 2 ex

This species has an obvious central calicle, around which the secondary calicles are arranged in rays. According to STUDER, however, the spines on the under side are not arranged in radiating rows. But GARDINER gives as a difference between this species and *D. irregularis*, that in *D. robusta* the spines cover the whole underside in obvious rows, while they are irregularly scattered in *D. irregularis*. I was fortunate enough to be able to examine a rather large number of specimens of this species and it appeared to me then that the arrangement of the spines is very variable and cannot serve as a specific character. At one extreme the spines form regular clearly recognisable ribs, that run to the centre; at the other the spines are so irregularly scattered, that no ribs can be seen, just as in *D. irregularis*. These two extremes are connected by a great many transitional forms, in which the spines are more or less regularly arranged. In all specimens however there is an obvious central calicle, from which the septa with the secondary calicles radiate regularly to the edge of the corallum. This is not the case in *D. irregularis* sothat the arrangement of the septa is the criterium. The wall of *D. robusta* is also perforated to a greater extent than is that of *D. irregularis*.

The dimensions in m.M. of my specimens are as follows:

Locality	long	broad	high	thick
Moluccos	135	135	55	17
„	240	160	85	17
„	170	150	50	15
„	205	185	55	15
„	245	185	105	20
„	80	70	25	18
Moluccos REINWARDT	310	200	110	—
Japan	320	210	115	20
Torres Straits . . .	240	110	125	—
Locality unknown. .	220	140	60	70
„ „ . .	230	150	110	—

The specimen procured by the Siboga Expedition is a fragment which had been killed on one side from close to the centre to the edge. The ray is 80 c.M. long, the thickness is 17 m.M. This specimen has thin but rough arborescent spines, which are densely packed; there is no sign of ribs.

2. *Döderleinia irregularis* Gardiner. (Plate IV, fig. 2).

Halomitra irregularis Gardiner 1898.
Podabacia irregularis Studer 1901.
Döderleinia irregularis Gardiner 1909.

Stat. 225. 5700 M. N. 279° E. from Southpoint of South Lucipara-island. 1 ex.

A central calicle is not recognizable. Especially in the central area of the corallum the calicles are quite near each other and often even fuse. There is nothing to see about the arrangement of the septa like rays. At the edge of the corallum the secondary calicles are more distant from each other and the septa are regularly radiating. There are no recognizable ribs on the underside. The whole underside is densely covered with spines which are smaller

and little or not at all arborescent in the central area, but which get coarser and strongly arborescent at the edge.

The dimensions of the only specimen are: long 137, broad 100, high 55, thick 22 m.M.

3. *Döderleinia sluiteri* nov. spec. (Plate III, fig. 3, 4).

Stat. 240. Banda-anchorage. 1 ex.

This species is much lighter than both the species which have just been mentioned, for the thickness of the corallum is only 10 m.M. The wall shows a great many small perforations. Not only is the edge irregularly lobed, but also the whole surface of the corallum is not regularly arched. There are a great many swellings corresponding with holes on the underside. The septa are distinctly arranged in radiating rows. They are granulated and have irregular rough teeth. The principal calicle is indistinguishable from the secondary calicles. These are larger in the middle of the corallum, having 10 to 12 principal septa; towards the edge they are much smaller. There are only a few secondary calicles compared with both of the preceding species. In the middle of the corallum the secondary calicles are rather densely packed, but towards the edge there are long, uninterrupted septa. In this character and in the lightness of the corallum this species agrees more with a *Halomitra* than do the two other species. It may however be recognized as a species of *Döderleinia* at first sight by the rough, partially arborescent spines and by the dense granulation.

The spines form obvious rows, which reach nearly to the centrum. Here is a small central area of 20 to 25 m.M. diameter, where the spines have been irregularly placed. In this central area too there are perforations of the wall. The specimen is 295 m.M. long, 155 m.M. broad, 47 m.M. high and 10 m.M. thick.

A small specimen from Stat. 282 (long 68, broad 60, high 18 and thick 10 m.M.) perhaps belongs also to this species. There is an obvious large principal calicle.

Halomitra Dana.

Of the nine species which STUDER reckons as belonging to this genus in his ample description, GARDINER leaves in the genus *Halomitra* only four species. The others he arranges (and rightly in my opinion) under other genera: *Döderleinia*, *Podabacia* and *Fungia*; while he is in doubt about *Halomitra fungites* Studer. As species belonging indubitably to the genus *Halomitra* there remain: *H. pileus* Dana, *H. tiara* Agassiz, *H. concentrica* Studer and *H. philippinensis* Studer, to which I can add *H. louwinae* as a new species collected by the Siboga Expedition. These five species can be distinguished from each other in the following way:

1.	Central calicle present	2
	No central calicle, septa in rows more or less perpendicular to each other	*H. louwinae*
2.	Central calicle small, as large or a little larger than the secondary calicles	3
	Central calicle large, easy to distinguish from the secondary calicles .	4
3.	Secondary calicles very prominent (± 10 m.M.)	*H. pileus*
	Secondary calicles rather prominent (at most 5 m.M.)	*H. tiara*

4. Secondary calicles in concentric rows, not much perforated . . . . *H. concentrica*
   Secondary calicles in irregular concentric rows, very much perforated.
   The ribs not running to the centrum . . . . . *H. philippinensis.*

*1. *Halomitra pileus* Dana.

Halomitra pileus Dana 1846.
Halomitra pileus M.-Edwards et Haime 1851.
Halomitra pileus M.-Edwards 1860.
Halomitra clypeus Verrill 1864.
Halomitra pileus Ortmann 1888.
Halomitra pileus Studer 1901.

Moluccos. VAN DER HUCHT. leg. 5 ex. — Indian Ocean. Leiden Mus. 1 ex.

Of this species I had only some young specimens of which the smallest with a diameter of 60 m.M. has an obvious scar of attachment. The corallum is rather thick namely 15 m.M. and has a great many fine perforations. The central calicle is as large as or only a little larger than the secondary calicles just as in the case of *H. tiara*, as opposed to *H. concentrica* and *H. philippinensis.*

In the central calicle as well as in the secondary calicles there is an obvious columella.

The species looks much rougher than *H. tiara*, because the principal septa have very long irregular teeth with deep incisions between them, and because the secondary calicles are more prominent (10 m.M.). Especially at the edge of the secondary calicles the septa have long teeth. The ribs are represented by rows of spines which reach to the centre. At the top of the spines there are a few grains; otherwise the spines are quite smooth, just like the septa. All the ribs are alike; secondary ribs are not present.

2. *Halomitra tiara* Agassiz.

Halomitra tiara Verrill 1864.
Halomitra tiara Quelch 1886.
Halomitra tiara Studer 1901.

Stat. 240. Banda-anchorage. 2 ex.
Stat. ? 1 ex.
Moluccos. VAN DER HUCHT. 1 ex. — Indian Ocean. Leiden Mus. 2 ex. — Locality unknown. 1 ex.

I had before me some fine large specimens of this species. In comparison with specimens of *H. pileus* it strikes one that those of this species are very light, and indeed the corallum is only 10 m.M. thick. The wall is very much perforated. The central calicle is rather small, has only a diameter of ± 15 m.M. and is not much larger than the secondary calicles. *H. tiara*, unlike *H. pileus*, shows no sign of a columella. The principal septa have rather large teeth (6 to 7 at 10 m.M.), but not such large and irregular ones as *H. pileus*. The secondary calicles protrude only about 5 m.M., sothat the surface of this species is much more smooth than that of *H. pileus*. On the underside the larger and smaller ribs alternate. The larger ribs are only indicated by rows of smooth spines, ± 2 m.M. long, which sometimes are flattened a little in the direction of the ribs. The rows of spines run to the centre. The smaller ribs are low lamellae without spines, they do not reach the centre.

The specimens examined by me have the following dimensions:

Locality	diameter	height
Stat. 240.	216	85
Stat. 240.	150—250	140
Stat. ?	230—250	120
Moluccos.	350	260
Locality unknown . .	260	140
Indian Ocean	250—310	240
Indian Ocean, ...	280—310	220

The first mentioned specimen from Stat. 240 has a rather regularly arched surface and has an obvious scar of attachment. The second specimen from Stat. 240 is more irregular and has a strongly undulating edge. The specimen from Stat. ? has also an undulating edge and is distinguished from the others by its somewhat thicker spines.

3. *Halomitra louwinae* nov. spec. (Plate 3, fig. 1, 2).

Stat. 240. Banda-anchorage. 2 ex.
Stat. ? 2 ex.

The Siboga Expedition collected four specimens of this very striking species. The corallum is rather thin (10 to 15 m.M.). The wall shows many small round perforations. There is no sign of a central calicle, there is not even a centre. Also the secondary calicles are small and indistinct and they protrude only a little or not at all. The subsidiary calicles are surrounded by 6 to 8 principle septa. The septa are not arranged in radiating rows as in the other species of *Halomitra*, but near the edge they form parallel rows perpendicular to the edge, but which decline in several directions towards the middle and meet each other at about right angles. This gives the impression that they are regenerated specimens. Two of them are regenerated indeed, e. g. the figured specimen; about the others I am not sure. But I don't think that the direction of the septa and costae is wholly on account of the regeneration. The teeth are triangular or oblong, larger than those of *H. tiara*, but no so large as those of *H. pileus*.

The larger ribs are indicated by rows of strong conical spines with a few grains at the top, 6 to 7 to every 10 m.M. These rows are arranged just like the septa. The smaller ribs are very short and but slightly developed.

The four specimens have the following dimensions:

Locality	diameter	height
Stat. 240	200	115
Stat. 240	160	90
Stat. ?	190—215	140
Stat. ?	140—165	65

The last mentioned specimen is very flat, the second specimen is only a little flattened. Both the other specimens are more conical.

Agariciidae.

Pavona Lamarck.

The species of this genus are very difficult to distinguish, so that one must not wonder that there is a great confusion in literature over them. The number of described species is accordingly numerous. Vaughan has put a large part of it in order by his Synopsis of species of *Pavona* in his work: Corals from Murray Islands etc. 1918. In this synopsis Vaughan still distinguishes 27 species but adds that there are probably or rather certainly several of them, which are synonyms. If it was possible to compare all the described species with each other than the number of species would diminish very much more in my opinion.

I was able to examine 41 colonies in all, and could distinguish 9 different species among them.

*1. *Pavona lata* Dana.

Pavonia lata Dana 1846.
Lophoseris lata M.-Edwards 1860.
Pavonia lata Brüggemann 1879.
Pavonia lata Ridley and Quelch 1886.

Billiton. 1 ex.

A colony 200 m.M. high, 180 m.M. broad, Y-like in transverse section, thus for a large part consisting of two laminae. Carinae not present.

2. *Pavona decussata* Dana.

Pavonia decussata Dana 1846.
Pavonia angularis Klunzinger 1879.
Pavonia decussata Quelch 1886.
Pavonia cristata Gardiner 1898.
Pavonia angularis v. Marenzeller 1906.
Pavonia decussata Bedot 1907.
Pavonia angularis Gravier 1911.

Stat. ? 2 ex.
Nias. 1 ex. — Amboina. Ludeking leg. Leiden Mus. 3 ex. — Java. Müller leg. Leiden Mus. 1 ex. — Sumatra. 1 ex. — Billiton. 1 ex. — Locality unknown. 1 ex.

Pavona decussata is very nearly allied to *P. danai*, the principal (perhaps the only) difference is according to Vaughan the breadth of the lamellae. If one recognizes as a specific character the breadth that Dana gives for *P. boletiformis* Dana (= *P. danai* M.-Edw. et H.) namely that the lamellae are seldom broader than an inch, *P. angularis* Klunzinger and *P. decussata* Bedot must not be reckoned as synonymous with *P. danai*, as they are by Vaughan (1918), but with *P. decussata* Dana. The breadth of the lamellae in *P. decussata* can vary a great deal. The edges of the lamellae are often incised and form narrower lobes in that way, but not to the same extent as in the typical *P. danai*. In both species the carinae are absent or are poorly developed. The ambulacra are sometimes slightly convex, but generally flat, in one instance they are even concave. The septo-costae alternate much, sothat it seems as if

they are wide apart. The columella is poorly developed, in broad mouths elongated in the direction of the calicle, while it is often absent. The specimen from Nias, though only 60 m.M. high, has thicker lamellae than the others (namely 7 to 8 m.M.). The specimen of unknown locality is a very large colony 300 m.M. high and 400 m.M. in diameter.

3. *Pavona danai* (M.-Edw. et H.).

Pavonia boletiformis Dana 1846.
Lophoseris danai M.-Edwards 1860.
Pavonia danae Verrill 1864.
Pavonia complanata Verrill 1867.
Pavonia laxa Klunzinger 1879.
Lophoseris laxa Ortmann 1888.
Lophoseris laxa Ortmann 1891.
Pavonia laxa v. Marenzeller 1901.
Pavona danai Vaughan 1918.

Stat. 78. Lumu-Lumu-shoal, Borneo-bank. 1 ex.
Stat. ? 1 ex.
Amboina. HOEDT leg. Leiden Mus. 1 ex. — Timor. WIENECKE leg. Leiden Mus. 1 ex. — South coast Java. MÜLLER leg. Leiden Mus. 1 ex. — Moluccos. VAN DER HUCHT. leg. 1 ex. — The indo-australian Archipelago. 1 ex.

The specimens collected by the Siboga Exp., from the south coast of Java and the indo-australian Archipelago have a part of the fronds very broad, exceeding the breadth which DANA characterized as specific, namely 1,5 to 2 inches. I must reckon them as belonging to this species however as the fronds of my specimens of *P. decussata* are much broader still.

*4. *Pavona cactus* (Forskål).

Madrepora cactus (Forskål) 1775.
Pavonia cactus Ehrenberg 1834.
Pavonia cactus Lamarck 1836.
Pavonia cactus Dana 1846.
Lophoseris cactus M.-Edwards et Haime 1851.
Lophoseris cactus M.-Edwards 1860.
Pavonia cactus Klunzinger 1879.
Lophoseris cactus Duncan 1886.
Lophoseris formosa Ortmann 1888.
Pavonia cactus Studer 1901.
Pavonia cactus v. Marenzeller 1906.
Pavonia cactus Gravier 1911.
Pavona cactus Vaughan 1918.

Indo-australian Archipelago. Dr. J. J. HAVER DROEZE leg. Leiden Mus. 2 ex.

Both specimens agree in all respects with KLUNZINGER's description.

5. *Pavona frondifera* Lamarck.

Pavonia frondifera Lamarck 1836.
Pavonia frondifera Dana 1846.
Lophoseris frondifera M.-Edwards et Haime 1851.

Lophoseris frondifera M.-Edwards 1860.
Pavonia frondifera Verrill 1864.
Pavonia frondifera Gardiner 1898.
Pavonia frondifera Studer 1901.

Stat. 213. Banda-anchorage. 2 ex.
Billiton. 1 ex. — Singapore. 2 ex. — Java. JUNGHUHN leg. Leiden Mus. 1 ex. — Java Sea. BUITENDIJK leg. Leiden Mus. 1 ex. — Indo-Australian Archipelago. 1 ex. — Indian Ocean. 2 ex.

In this species the carinae are always strongly developed. The septo-costae are all quite alike or very nearly so. Generally the ambulacra are rounded.

*6. *Pavona divaricata* Lamarck.

Pavonia divaricata Lamarck 1816.
Pavonia divaricata Dana 1846.
Lophoseris divaricata M.-Edwards et Haime 1851.
Lophoseris divaricata M.-Edwards 1860.
Pavonia divaricata Brüggemann 1879.
Pavonia divaricata Quelch 1886.
Lophoseris divaricata Ortmann 1888.
Lophoseris divaricata Ortmann 1889.
Pavonia divaricata Gardiner 1898.

Indo-australian Archipelago. Leiden Mus. 1 ex. — Indian Ocean. VAN DER HUCHT leg. 2 ex. — Pacific. 1 ex.

This species forms strongly arborescent colonies, consisting of narrow, thick, angular fronds, which are coalescent. The septa vary a good deal in size; the ambulacra are flat. The calicles have different diameters of which the largest is 3 m.M. The columella is absent, or it consists of a compressed style formed by the fused free edges of the septa. The specimen from the Pacific is still young; it consists of a flat plate, of which some of the lobes are prominent, and have the typical shape of *Pavona divaricata*.

7. *Pavona praetorta* Dana.

Pavonia praetorta Dana 1846.
Pavonia praetorta Verrill 1864.
Pavonia praetorta Quelch 1886.
Lophoseris praetorta Ortmann 1888.

Stat. ? 2 ex.
Amboina. LUDEKING leg. Leiden Mus. 1 ex. — Indo-australian Archipelago. Leiden Mus. 1 ex. — Locality unknown. 1 ex.

The ambulacra are flat; the septa are nearly all of one and the same size; in the younger parts of the colony the difference between the septa is greater. The columella was not always very distinct in these specimens, although it is so according to VAUGHAN. The two specimens of the Siboga Expedition differ from each other in general form. One specimen forms a regular semiglobular colony consisting of rather broad twisted fronds, which are often fused. The other specimen is spread out more in one plane and consists of narrower fronds, each of which is slightly twisted, but none of which are fused. The other three specimens form several transitional stages between these two extremes.

8. *Pavona varians* Verrill.

Pavonia varians Verrill 1864.
Lophoseris repens Brüggemann 1877.
Pavonia repens Klunzinger 1879.
Lophoseris repens Ortmann 1888.
Lophoseris repens Ortmann 1889.
Pavonia repens Whitelegge 1898.
Pavonia repens Gardiner 1898.
Pavonia intermedia Gardiner 1898.
Pavonia calicifera Gardiner 1898.
Pavonia repens Gardiner 1905.
Pavona varians Vaughan 1907.
Pavona varians Vaughan 1918.

Stat. 296. Anchorage off Noimini, South coast of Timor. 1 ex.

The Siboga Expedition collected a round stone, on which there are two young colonies of this species. VAUGHAN is right when he considers *P. repens* as a synonym of *P. varians*. The difference between these two species, according to the authors, is that *P. repens* has a papilliform columella. In the specimens of the Siboga Expedition there are some calicles with round papilliform columellae, while others have very short styles and in most of them the free edges of the septa are enlarged to form flat plates. From this it appears that the alleged difference does not exist.

9. *Pavona diffluens* (Lamarck). (Plate 3, fig. 5).

Astraea diffluens Lamarck 1816.
Lophoseris diffluens M.-Edwards et Haime 1851.
Lophoseris diffluens M.-Edwards 1860.

Stat. 303. Haingsisi, Samau-island. 1 ex.
Stat. ? 1 ex.

This species is distinguished from *P. varians*, as BRÜGGEMANN says (1877) by the absence of the carinae and of the columella. The septa are unequal. Generally the columella is absent altogether, but it sometimes persists as a small irregular style. The specimen from Stat. 303 is attached to the base of an *Acropora*.

Podabacia M.-Edwards et Haime.

The only representative of this genus that was known in former days, *P. crustacea*, was included in the genus *Halomitra* by several authors (DUNCAN, STUDER). In 1905 GARDINER placed the genus *Podabacia* in the family *Fungiidae*, but in 1909 he resolved, on account of the definition of the family *Fungiidae* as given by VAUGHAN in 1905, according to which the grown up *Fungiidae* form free individuals, and not attached ones, to remove *Podabacia* from this family. I agree with this definition and so I place *Podabacia* in the family *Agariciidae*. In my opinion this genus is closely related to the genus *Pavona*. This opinion is also supported by the fact that *Podabacia crustacea* is synonym with *Pavonia explanulata* Dana, from which I conclude that this excellent author includes *Podabacia* in the genus *Pavona*.

Up till now only two species of the genus *Podabacia* have been known namely *P. crustacea* (Pallas) and *P. dispar* Verrill. The latter was described by VERRILL in a note on pag. 136 in his article „Bermudian and West-Indian Reefcorals". One must not be surprised because in 1909 GARDINER says that only one species of *Podabacia* is known. To these two species I can add three more, which have not yet been described or which have been included previously in another genus.

1. *Podabacia crustacea* (Pallas).

Madrepora crustacea Pallas 1776.
Madrepora pileus Esper 1791.
Pavonia explanulata Dana 1846.
Podabacia crustacea M.-Edwards et Haime 1851.
Podabacia crustacea M.-Edwards 1860.
Podabacia crustacea Verrill 1864.
Podabacia crustacea Studer 1877.
Halomitra crustacea Duncan 1883.
Halomitra (Podabacia) crustacea Duncan 1886.
Podabacia crustacea Ortmann 1888.
Podabacia crustacea Ortmann 1889.
Halomitra (Podabacia) crustacea Studer 1901.
Podabacia crustacea Gardiner 1905.
Podabacia crustacea Bedot 1907.

Stat. 213. Saleyer-anchorage. 1 ex.
Billiton. 3 ex. — Moluccos. VAN DER HUCHT leg. 1 ex. — Amboina. LUDEKING leg. Mus. Leiden. 1 ex. — Singapore. 3 ex. — Indian Ocean. 2 ex.

This species with its typical caliciform corallum has been described several times and in some detail by BEDOT the last time, sothat it is superfluous to repeat its description. One of the specimens from the Indian Ocean is very large (diameter 52 c.M.) and has a strongly lobed edge. A specimen from Singapore is not caliciform but is rolled up into a spiral. The specimen of the Siboga Expedition is very young, 35 m.M. diameter, and agrees in all respects with DUNCAN's description and figure.

*2. *Podabacia involuta* nov. spec. (Plate IV, fig. 4; Plate V, fig. 4, 5; Plate VI, fig. 3).

Singapore. 1 ex.

The unique and magnificent specimen of this species which I had before me, is really caliciform, but the edge is divided so strongly into separate lobes and these lobes have been bent inwards and fused together so much that it is hard to see anything of the inside of the calix.

The centrum from which the septa radiate is obvious, but this part of the coral had been killed. On the underside there is a short stalk with a diameter of 20 m.M. by which the colony was attached. Unfortunately the colony is broken near the centrum so that only the larger part has been left. It was due to this fact that I could examine also the innerside of the colony where the calicles are, for all the lobes are bent in such a way that the ribs are always turned to the outside and the calicles to the inside. The thickness of the corallum is

3 m.M. at the edge and 10 m.M. in the central area. The wall has a large number of long narrow perforations.

The centre of the innerside of the colony agrees closely with *P. crustacea*. The calicles are situated irregularly and close to each other, so that the lateral distance between them can be 10 m.M. or less, whilst the distance between the rows of calicles often exceeds 20 m.M. The calicles are deeply sunk in so that the septa between the calicles are strongly bent. The calicles are formed by 8 to 12 septa, which can be distinguished as thinner and thicker ones. These do not always alternate regularly. The thickened principal septa have rough, strongly grained edges without teeth.

There are calicles on the lobes quite near to the edge, but here they are further apart than in the central area of the colony, and the septa are not so strongly bent; so that the calicles are not so obvious as they are near the centre. These calicles are smaller and are formed by 6 to 8 septa. Thinner and thicker septa alternate regularly in the marginal area. The septa are very densely granulated. A columella is absent as well as in the central area of the colony.

On the outside of the colony the ribs are visible and clearly run towards the centrum. All the ribs are equal, and very densely covered with small very irregular spines. Between the ribs there are many slits in the wall.

The colony has the shape of an ellipse, judging by the part that I was able to examine. The shorter axis is 12 c.M. long, the longer 26 c.M., the height is about 28 c.M.

*3. *Podabacia lobata* nov. spec. (Plate IV, fig. 5; Plate VI, fig. 4).

Japan. 1 ex. — Japan. Mus. Leiden. 1 ex.

The colony has the shape of a shallow calicle with a strongly lobed edge. These lobes are undulating and irregular in shape. The wall is not perforated. At the edge the thickness of the corallum is 2 m.M., towards the middle the thickness increases gradually to 1 c.M. The colony is attached by a small stalk with a diameter of 1 to 2 c.M. The centre of the colony is occupied by the large principal calicle, which is 15 to 20 m.M. long and 2 to 3 m.M. broad.

The columella consists of an irregular trabecular meshwork in the principal calicle as well as in the secondary calicles. The latter are irregularly dispersed, and are 2 to 5 m.M. in diameter. The number of septa that form the secondary calicles varies a good deal; I counted from four to seventeen. The septa vary in thickness. The principal septa are thickened especially near the calicles, where the thickness sometimes exceeds 1 m.M.; but they have sharp edges. The edge is covered just as in the perforated smaller septa, with small irregular teeth; and on the sides of the septa there are a few scattered grains. The principal septa are more prominent than the smaller ones. The ribs are low and thin, with very small spines on the edge or with none at all. There are small secondary ribs only along the edge of the corallum; everywhere, but in this region there is a smooth space 1 m.M. broad between the ribs.

The diameter of both specimens is about 20 c.M.

This species can be distinguished from *P. dispar* by the arrangement of the ribs (alternating only along the edge), by the smaller spines on the ribs, by the smaller teeth on the septa, and

by the much thicker principal septa. The corallum is also thicker and heavier in comparison. The above mentioned large specimen of *P. crustacea* strongly resembles this species in general form, but can be recognized at once as *P. crustacea* by the larger spines and the numerous perforations.

*4. *Podabacia dispar* Verrill. (Plate V, fig. 6).

Podabacia dispar Verrill 1901.

Timor. WIENECKE leg. Mus. Leiden. 1 ex.

The specimen that I had before me agrees in every way with the description and the figures that VERRILL gives of this species. The wall is not perforated, The colony, compared with the last species, is more irregular in shape, for it consists of several caliciform lobes. One half of the colony consists of a rather regular shaped lobe with a large central calicle whence the septa radiate, and very few secondary calicles. The other half is formed by several irregular lobes each with a central calicle, all of which are smaller than the central calicle of the first half. In this part of the colony there are more secondary calicles: they are consequently nearer to each other. The secondary calicles are situated principally next to each other, not behind each other, sothat the septa are very long.

The principal ribs are rather prominent and covered with small spines.

*5. *Podabacia elegans* (M.-Edw. et H.). (Plate IV, fig. 6, 7, 8).

Pavonia elephantotus Dana 1846.
Mycedium elegans M.-Edwards et Haime 1851.
Mycedium elegans M.-Edwards 1860.

Japan. 2 ex.

In this species the caliciform shape of the corallum, characteristic for the other species of the genus, is lost. A primary centre may still be recognized however, but the edge has a great many deep incisions and is divided into separate lobes. The secondary calicles have become secondary centra from which the septa radiate. Thus the colony gives one the impression of being composed of a number of irregular fanshaped lobes. The lobes are always arranged in such a way that the side on which the calicles are is always turned uppermost, as opposed to the arrangement in *P. involuta*. In the principal centrum the point of attachment of the colony is on the underside. Here the colony is somewhat damaged, however, but nevertheless one can see that the stalk cannot have been more than a few centimetres thick. The wall is not perforated. The secondary calicles are large, being up to 5 m.M. broad, generally irregularly scattered, but sometimes arranged in short rows parallel to the edge. The distance between the calicles and the edge is never less than 5 c.M. The number of septa that form a secondary calicle varies a good deal. I counted as many as 28. The septa vary in thickness, but the principal septa are not so thick as in *P. lobata*, and they have a sharp edge. The principal septa are especially thickened in the basal part of the fanshaped lobes, not only near the calicles however, as in *P. lobata*, but all along the septa. The principal septa have along the edge very fine regular triangular teeth, of which I counted 32 in 1 c.M., and on the sides of the principal septa there are but

few grains. The smaller septa have irregular small teeth on the edge and more grains than the principal septa on the side. The principal septa are more prominent than the smaller ones.

The ribs are low, and as broad as high. They are quite near to each other so that there is no space left between them, as in *P. lobata*. At the edge, principal and smaller ribs can be distinguished alternating with each other, whereas nearer the centrum all the ribs are exactly alike. The ribs are covered with grains and some conical spines on which are a few granulations.

In the Museum at Amsterdam there is a colony which is 26 c.M. long and 15 c.M. broad and a separate fan shaped lobe.

The specimens here described are undoubtedly synonymous with *P. elephantotus* Dana. This very appropriate name can however not be given to this species, so the specific name *elegans* given by M.-Edwards and Haime must be used, for *Mycedium elegans* M.-Edw. et H. is synonymous with *Pavonia elephantotus* Dana.

In 1901 Verrill fully discussed in his article "Bermudian and West-Indian Reefcorals" the genus *Mycedium* which had given rise to much confusion. *Madrepora elephantotus* Pallas, a synonym for *Madrepora elephantotus* Esper and the type species of the genus *Mycedium* Oken is not an *Agaricia* at all or even an *Agaricia*-like coral, which can be seen at once from the fact that Pallas gives "Oceanus indicus" as place of origin. Indeed Verrill places the genus *Mycedium* in the family *Echinoporidae* and he is right in my opinion.

Milne-Edwards and Haime describe four species of the genus *Mycedium*, namely: *M. elephantotus*, *M. tubifex*, *M. okeni* and *M. elegans*. Of these *M. tubifex* is synonymous with *Phyllastraea tubifex* Dana and *M. okeni* belongs, as Quelch also observes, to the genus *Phyllastraea* too. According to Verrill *Phyllastraea* Dana is synonymous with *Mycedium* Oken; perhaps *Mycedium okeni* M.-Edw. et H. is the same as *Madrepora elephantotus* Pallas, sothat Milne-Edwards and Haime are right in placing these two species in the genus *Mycedium*.

The *Mycedium elephantotus* M.-Edw. et H., that comes from West-India is however a species distinct from *Madrepora elephantotus* Pallas. This species of M.-Edwards and Haime is probably an *Agaricia* synonymous with *Agaricia (Mycedia) cucullata* Dana, wrongly named *Agaricia elephantotus* by Vaughan (1901).

Lastly Milne-Edwards and Haime think that their *Mycedium elegans* is synonymous with *Madrepora elephantotus* Esper. This cannot be so, for the species of Esper is synonymous with *Madrepora elephantotus* Pallas, so it is an Echinoporid and *Mycedium elegans* is not according to the description and figure. Further Milne-Edwards and Haime are of opinion that *Mycedium elegans* is synonymous with *Pavonia elephantotus* Dana, and they are right in my opinion. (According to Vaughan (1918) *Pavonia elephantotus* Dana is a *Mycedium*).

I think that it is best to place this species in the genus *Podabacia* just as *Pavonia explanulata* Dana = *Podabacia crustacea* (Pallas).

From this it also appears that the genera *Pavona* and *Podabacia* are nearly allied.

Podabacia elegans is nearest to *P. dispar* Verrill and my *P. lobata*. All these three species have an unperforated wall and have only a few small spines or none at all on their slightly developed ribs.

Leptoseris M.-Edw. et Haime.

1. *Leptoseris gardineri* nov. nomen.

Folioseris papyracea Rehberg 1892.
Leptoseris papyracea Gardiner 1905.

Stat. 19. Bay of Labuan Tring, west coast of Lombok. 4 ex.
Amboina. HOEDT leg. Leiden Mus. many ex.

Both REHBERG and GARDINER identified this species with *Pavonia papyracea* Dana, and I should have made the same mistake, had I not seen DANA's type specimen in Washington. EHRENBERG's description of his *Agaricia crispa* is very inadequate and it may be best to neglect that description. DANA compares his *Pavonia papyracea* with this *Agaricia crispa* and that may be the cause of REHBERG's and GARDINER's mistake.

My specimens agree in every way with GARDINER's excellent description and figure.

2. *Leptoseris papyracea* (Dana). (Plate V, fig. 7).

Pavonia papyracea Dana 1846.

Stat. 96. South-east side of Pearl-bank, Sulu-archipelago. 1 ex.
Stat. 240. Banda-anchorage. Some broken ex.
Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

The specimen from Stat. 96, which may be called large for this species, agrees in every way with DANA's description. The fronds are about 10 m.M. broad, strongly lobed and twisted. The specimen from Stat. 315 is very small (about 2 c.M.) but it is strongly arborescent and its fronds are only 2 to 3 m.M. broad. Although agreeing in finer structure the above specimens differ so much in general form that they might be taken for different species, were it not for the fact that the specimens from Stat. 240 form a transition between them.

These specimens are smaller and have narrower fronds than that from Stat. 96, but they are with one exception larger than the specimen from Stat. 315. In all specimens the finer ribs are covered with very small teeth.

If *Leptoseris digitata* Vaughan (1907) is not synonymous with *L. papyracea*, both species are at any rate nearly allied.

3. *Leptoseris tubulifera* Vaughan. (Plate V, fig. 8).

Leptoseris tubulifera Vaughan 1907.

Stat. 240. Banda-anchorage. 6 ex.

All these specimens are young and small compared with VAUGHAN's specimens. They have a very regular and elegant shape. The largest specimen has a diameter of 4 c.M. and a height of 2 c.M. This specimen alone has obvious arborescent tubes such as VAUGHAN described. The other specimens show distinctly that the tubes arise by the bending outward of the margins of the lobes, and their subsequent meeting and fusion.

4. *Leptoseris hawaiiensis* Vaughan.

Leptoseris hawaiiensis Vaughan 1907.

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 2 ex.

A large specimen with a maximum diameter of 18 c.M. and a fragment with an axis of 10 c.M. were collected by the Siboga Expedition. The first specimen has a strongly lobed but not undulating edge and is only slightly caliciform.

Although they do not agree altogether with the description that VAUGHAN gives of this species, I think the differences too small to justify separating them into different species. According to VAUGHAN the septo-costae are equal or only slightly alternating; in the specimens of the Siboga Expedition however the septo-costae alternate obviously. Further the calicles are larger than VAUGHAN says they are. The elliptical calicles can be as long as 10 m.M. and have accordingly a larger number of septa; I counted up to 36. In all other respects my specimens agree perfectly with VAUGHAN's description.

5. *Leptoseris fragilis* M.-Edw. et H.

Leptoseris fragilis M.-Edwards et Haime 1849.
Leptoseris fragilis M.-Edwards et Haime 1851.
Leptoseris fragilis M.-Edwards 1860.
Leptoseris fragilis Gardiner 1905.

Stat. 144. Anchorage North of Salomakiee-(Damar-)island. 1 ex.
Stat. 257. In Du-roa-strait, Kei-islands. 1 ex.
Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

The specimen from Stat. 257 is quite flat and that from Stat. 315 is sub-caliciform. Both specimens have a large central calicle and only a few indistinct secondary calicles.

6. *Leptoseris incrustans* Gardiner.

Leptoseris incrustans Gardiner 1905.

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

This unique specimen agrees entirely with the description and figure that GARDINER gives. It is 40 to 45 m.M. large. Except along the extreme edge it is wholly attached.

7. *Leptoseris tenuis* nov. spec. (Plate V, fig. 9, 10).

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

This species is attached firmly to the substratum and forms on it a very thin layer (1 m.M. thick), sothat all roughnesses of the substratum (a worn piece of coral) are to be seen. The edge is also not free from the substratum. This species has certain resemblances to *Leptoseris incrustans*, but it has a finer structure. A central calicle is present, about 1 m.M. large, surrounded by 25 septa. The calicle is entirely filled up by the columella. The secondary calicles

are very indistinct, and are scarcely distinguishable by the naked eye, because they are so narrow and not sunken in nor prominent as in the other *Leptoseris* species. They are strongly elliptical with the long axis perpendicular to the direction of the septo-costae. The secondary calicles are irregularly scattered, now far from each other i. e. about 10 m.M. and now close to each other; sometimes they even fuse when there arise calicles with long axes (two m.M.), while the single calicles are at most one m.M. long.

The columella is formed by a compressed style over the whole length of the calicle or by separate papillae standing in a row. All the septa are equal and at least twice as thick as the space between them. By this character this species can be at once distinguished from *L. incrustans*. The sides of the septa are strongly granulated; there are no teeth along the edge.

Siderastrea Blainville.

1. *Siderastrea savignyana* M.-Edw. et H. (Plate V, fig. 11).

Siderastrea savignyana M.-Edwards et Haime 1850.
Astraea savignyana M.-Edwards et Haime 1857.
Siderastraea savignyana Klunzinger 1879.
Siderastraea savignyi Rehberg 1892.
Siderastrea savignyana Vaughan 1907a.
Siderastraea savignyana Gravier 1911.

Stat. 273. Anchorage off Pulu Jedan, East coast of Aru-islands (Pearl-banks). 1 ex.

A hemispherical colony with a diameter of 16 to 17 c.M. was collected by the Siboga Expedition, and must undoubtedly be reckoned as belonging to this species. Previously *Siderastrea savignyana* was only known from the East coast of Africa and the Red Sea.

Psammocora Dana.

According to Gardiner both the generic names *Maeandroseris* Rousseau and *Plesioseris* Gardiner must disappear and be used instead *Psammocora*. In my opinion it is the same with the genus *Stephanaria* Verrill. According to Verrill *Stephanaria* is distinguished from *Psammocora* by the possession of papilliform pali and columella.

Quelch on the other hand, who preserves the genus *Stephanaria*, is in doubt as to whether these differences are sufficient to justify the separation into different genera.

These differences do not however exist in reality. According to Gardiner *Ps. divaricata* and *Ps. haimeana* have a central rod as columella, surrounded by six smaller rods, which are perhaps pali. Klunzinger too finds an obvious columella in *Ps. haimeana*, which chiefly consists of several papillae, which are the innermost teeth of certain septa. In the specimen of *Ps. haimeana* (Stat. 313) that I examined, I saw a single papilliform columella in some calicles; while in others there was a similar columella too but surrounded by other papillae, which could be considered as pali. There were still other calycles in which there was no columella at all. So in my opinion the genus *Stephanaria* should be absorbed by *Psammocora*.

1. *Psammocora contigua* (Esper).

Madrepora contigua Esper 1797.
Psammocora plicata Dana 1846.
Psammocora contigua M.-Edwards et Haime 1851.
Psammocora contigua M.-Edwards 1860.
Psammocora contigua Ortmann 1888.
Psammocora contigua Gardiner 1898.
Psammocora contigua Whitelegge 1898.
Psammocora contigua Gardiner 1905.

Stat. 71. Makassar. 1 ex.
Stat. 213. Saleyer-anchorage. 2 ex.
Stat. 252. West side of Taam-island. 1 ex.
Stat. 258. Tual-anchorage, Kei-islands. 1 ex.
Stat. 313. Anchorage East of Dangar Besar, Saleh-bay, Sumbawa. 1 ex.
Moluccos. REINWARDT leg. Leiden Mus. 1 ex. — Larantuka. Dr. J. SEMMELINK leg. Leiden Mus. 1 ex. — Java. JUNGHUHN leg. Leiden Mus. 1 ex. — Singapore 2 ex. — Locality unknown. 2 ex.

This species forms arborescent colonies. The calicles stand in rows and have not sunk in. The septa are unequal, and can be divided into thicker short septa, of which there are generally four in each calicle, and, alternating with these, thinner septa, which continue as a network outside the calicles into the coenenchym.

2. *Psammocora divaricata* Gardiner.

Psammocora divaricata Gardiner 1905.

Stat. 282. Anchorage between Nusa Besi and the N. E.-point of Timor. 2 ex.

The two little colonies (5 to 10 c.M.) wholly agree with GARDINER's description.

3. *Psammocora planipora* M.-Edw. et H.

Psammocora planipora M.-Edwards et Haime 1851.
Psammocora planipora M.-Edwards 1860.
Psammocora gonagra Klunzinger 1879.
Psammocora planipora Klunzinger 1879.
Psammocora planipora Ortmann 1888.
Psammocora planipora Ortmann 1889.
Psammocora planipora Bassett-Smith 1890.
Psammocora planipora v. Marenzeller 1906.
Psammocora gonagra Vaughan 1918.

Stat. 96. South-east side of Pearl-bank, Sulu-archipelago. 1 ex.

VON MARENZELLER has been able to compare the type of MILNE-EDWARDS and HAIME at Paris with others, and has found that *Ps. gonagra* Klunzinger is synonymous with *Ps. planipora* M.-Edw. et H.. GARDINER thinks that *Ps. gonagra* Klunzinger is synonymous with *Ps. digitata* M.-Edw. et H., but he does not give his reasons, sothat it is best to call this species *Ps. planipora* M.-Edw. et H.

The Siboga Expedition collected a small colony 3 c.M. long and 3 c.M. broad which

may be recognized as belonging to this species by the prominent protuberances with sharp edges and by the large mouths.

4. *Psammocora exesa* Dana.

Psammocora exesa Dana 1846.
Psammocora exesa M.-Edwards et Haime 1851.
Psammocora exesa M.-Edwards 1860.
Psammocora exesa Brüggemann 1879.
Psammocora exesa Quelch 1886.
Psammocora exesa Rehberg 1892.
Psammocora exesa Gardiner 1905.

Stat. 213. Saleyer-anchorage. 1 ex.

A large colony, 20 c.M. high, with a diameter of 30 c.M., was collected by the Siboga Expedition. It agrees perfectly with the description and the figures of DANA and GARDINER.

5. *Psammocora haimeana* Rousseau.

Psammocora haimiana M.-Edwards et Haime 1851.
Psammocora haimiana M.-Edwards 1860.
Psammocora haimeana Klunzinger 1879.
Psammocora haimeana Ortmann 1888.
Psammocora haimeana Bassett-Smith 1890.
Psammocora haimiana Gardiner 1898.
Psammocora haimeana Gardiner 1905.
Psammocora haimiana Vaughan 1918.

Stat. 313. Saleh Bay, Sumbawa. 1 ex.

This is a colony which agrees in every way with KLUNZINGER's description.

6. *Psammocora nierstraszi* nov. spec. (Plate II, fig. 3, 4).

Stat. 313. Anchorage East of Dangar Besar, Sumbawa. 1 ex.

This species forms massive colonies. I have made an incision of half a centimetre in it without discovering a substratum. No scar of attachment is visible. All around the calicles are equally well developed. So the colony can not have been attached. It is somewhat cylindriform, 10 c.M. long with a diameter of about 3 c.M. All around a large number of irregular knolls rise with sharp edges. Between these there are smaller knolls which are ridges sometimes and sometimes cones. The latter are generally somewhat higher than the former. Between these knolls the calicles are irregularly scattered, here in groups, there in short rows between the ridges.

The calicles are not separately sunken in. The calicles are ± 2 m.M. large, the mouth at most $^1/_3$ m.M.. About twelve septa reach the mouth. All the septa are equally thin; and the distance between them is greater than their thickness.

The septa are densely granulated. The columella is as high as the septa and is often shaped like a cross. The calicles, which are placed in groups or rows, are not separated. The synapticula form parallel rows at the sides of the ridges and cones. This can be seen

particularly well in the conical knolls. From the tips of the cones the septo-costae radiate in all directions and they are connected by three, four or more concentric rings of synapticula.

Pachyseris M.-Edw. et H.

The following species of this genus are known: *P. rugosa* (Lam.), *P. speciosa* (Dana), *P. levicollis* (Dana), *P. valenciennesi* M.-Edw. et H., *P. fluctuosa* Verrill, *P. involuta* Studer, *P. carinata* Brüggemann, *P. haimei* Quelch, *P. torresiana* Vaughan. I doubt whether the last three have any claim to be recognized, as will be explained later.

1. *Pachyseris speciosa* (Dana).

Agaricia speciosa Dana 1846.
Pachyseris speciosa M.-Edwards et Haime 1851.
Pachyseris speciosa M.-Edwards 1860.
Pachyseris speciosa Quelch 1886.
Pachyseris haimei Quelch 1886.
Pachyseris speciosa Duncan 1886.
Pachyseris speciosa Ortmann 1888.
Pachyseris speciosa Vaughan 1918.

Stat. 181. Ambon-anchorage. 1 ex.
Stat. 213. Saleyer-anchorage. 1 ex.

Quelch was of opinion that *P. speciosa* M.-Edw. et H. was a species distinct from *Agaricia speciosa* Dana, and he gave the name *P. haimei* to the former. The difference between them is as follows according to Quelch: *P. haimei* has very acute and elevated ridges, which throughout the corallum are concave on their sides and very sharp at their margin, and its large columella forms a wide continuous structure separating the ridges. This form has a finer and more delicate structure than *P. speciosa*. In *P. speciosa* the ridges are often irregular, rounded and very slightly elevated. The columella is absent or quite rudimentary. According to this description of Quelch the specimen from Stat. 181 could be called *P. haimei* and the specimen from Stat. 213 *P. speciosa*. In the specimen from Stat. 181 the ridges at the edge are generally sharp, though there are also rounded ones, while it is exactly the contrary with the specimen from Stat. 213. The last mentioned specimen is also rather thicker and heavier than that from Stat. 181. There is also a difference in the degree of development of the columella. This is developed to a greater extent in the specimen from Stat. 181 than in that from Stat. 213. Now Vaughan says that his specimen is absolutely identical with Dana's *P. speciosa* and my specimen from Stat. 181 agrees in all respects with Vaughan's figure. The difference in the ridges I don't think very important. In one specimen they are generally rounded, in the other sharp, just as in the case of other species of *Pachyseris*. So I think it better to drop the name *P. haimei*. *Agaricia speciosa* Dana is really synonymous with *P. speciosa* M.-Edw. et H.. Just as Vaughan did I find that the ribs of both specimens alternate or are of three different sizes. Both specimens are round disks with a diameter of about 10 c.M., and attached to a stalk in the middle.

2. *Pachyseris levicollis* (Dana).

Agaricia levicollis Dana 1846.
Pachyseris levicollis M.-Edwards et Haime 1851.
Pachyseris levicollis M.-Edwards 1860.
Pachyseris laevicollis Ortmann 1888.
Pachyseris levicollis Bassett-Smith 1890.
Pachyseris laevicollis Gardiner 1905.

Stat. 144. Anchorage North of Salomakiëe-(Damar)-island. 1 ex.
Stat. 213. Saleyer-anchorage. 1 ex.
Stat. 240. Banda-anchorage 1 ex.

These three specimens agree perfectly with the description and figure of DANA and with GARDINER's description. In contrast to the last mentioned species they are attached by a broad base. The specimen from Stat. 144 is a large, flat disk with a diameter of 20 to 28 c.M. The specimen from Stat. 213 is kidney-shaped and of irregular growth; the ridges are often perpendicular to each other. It is 14 c.M. long and 4 to 7 cM. broad. The specimen from Stat. 240 is still young and has a diameter of 55 m.M.

3. *Pachyseris involuta* Studer. (Plate III, fig. 6).

Pachyseris involuta Studer 1877.

Stat. 80. Borneo-bank. 1 ex.

The specimen agrees exactly with STUDER's figure but does not wholly agree with his description. A remarkable thing about this species, and a feature in which it differs from all the other species of *Pachyseris*, is that the mouths are not in the valleys but nearly at the top at the ridges. Instead of being convex between the oral axes with a sharp or round edge the septa are slightly concave here. The highest point of the septa is somewhat proximal to the oral axes. This can be seen clearly in STUDER's figure. The corallum is only one to two m.M. thick; thus it is thinner than STUDER indicates it to be. The ribs on the underside are very indistinct.

According to STUDER the septa are thin, I, however, think that, compared with other species, they are really thick; and STUDER's figure also shows that this is so.

Two kinds of septa can be distinguished, but the difference in thickness is very small. The distance between the oral axes is four m.M. According to STUDER the breadth of the valleys is two m.M. and of the ridges two m.M. also. This is right; the concave part of the septa is about as large as the convex part.

Although the specimen does not wholly agree with the description of STUDER, the agreement with his figure is nevertheless so exact, that I don't hesitate to ascribe it to this species. The specimen of the Siboga Expedition is a flat fragment which is 6 c.M. long. It was dredged at a depth of 34 M.

*4. *Pachyseris valenciennesi* M.-Edw. et H. (Plate V, fig. 2).

Agaricia rugosa Dana 1846.
Pachyseris valenciennesi M.-Edwards et Haime 1851.

Pachyseris valenciennesi M.-Edwards 1860.
Pachyseris monticulosa Verrill 1875.
Pachyseris valenciennesi Ortmann 1888.
Pachyseris valenciennesi Ortmann 1889.
Pachyseris monticulosa Studer 1901.

The indo-australian Archipelago. 1 ex.

A large colony 25 to 30 c.M. in diameter, that I had before me, agrees exactly with the description and figure that DANA gives of his *Agaricia rugosa*.

All the septa are equal, while according to M.-EDWARDS and HAIME this is not the case in *P. rugosa* Lam. The difference in the columellae is not so large as M.-EDWARDS and HAIME think. For I find in my specimen obvious series of lamellae in one place, closely resembling the columella of *P. rugosa* Lam. according to M.-EDWARDS and HAIME; in other places however these lamellae are but little developed or absent altogether.

Still both species are perfectly distinct. *P. valenciennesi* forms a very irregular disk with hollow protuberances and folded and turned back edges. *P. rugosa* Lam. consists of a more regular corallum attached by nearly the whole of its underside. On it there are large, massive, irregular lobes. In general appearance it resembles *Agaricia agaricites* from the West-Indies.

5. *Pachyseris rugosa* (Lam.). (Plate IV, fig. 3; Plate VI, fig. 2).

Agaricia rugosa Lamarck 1816.
Pachyseris rugosa M.-Edwards et Haime 1851.
Pachyseris rugosa M.-Edwards 1860.

Stat. 60. Haingsisi, Samau-island, Timor. 1 ex.
Stat. 303. Haingsisi, Samau-island, Timor. 1 ex.
Stat. ? 1 ex.
Larantuka. Dr. J. SEMMELINK leg. Leiden Mus. 1 ex. — Amboina or Timor. Leiden Mus. 1 ex. — Locality unknown. Leiden Mus. 1 ex.

The difference between this species and *P. valenciennesi* has been discussed in the description of the last mentioned species. The columella is well developed in *P. rugosa* and consists of an almost uninterrupted longitudinal lamella.

The specimen of unknown locality came from the Paris Museum.

6. *Pachyseris carinata* Brüggemann. (Plate V, fig. 3).

Pachyseris carinata Brüggemann 1879.

Stat. 60. Haingsisi, Samau-island, Timor. 1 ex.

A rather small colony 11 c.M. high and 12 c.M. broad agrees exactly with BRÜGGEMANN's description. This species is shaped more regularly than *P. rugosa* in every way, but it is nevertheless very nearly allied to it; it is indeed probable that the two species are identical.

7. *Pachyseris torresiana* Vaughan.

Pachyseris torresiana Vaughan 1918.

Stat. 303. Haingsisi, Samau-island, Timor. 1 ex.

One specimen agrees exactly with VAUGHAN's description and figures. From an undulating plate two crests, characteristic of this species arise. The columella too of my specimen is just the same as that of VAUGHAN's, but both *P. rugosa* and *P. carinata* have exactly similar columellae too so that this character which VAUGHAN gives cannot serve to distinguish them.

The shape of the crests then appears to be the only difference with *P. rugosa* and I doubt if this justifies a specific separation.

8. *Pachyseris* spec.

Stat. 133. Anchorage off Lirung, Salibabu-island. 2 ex.

These two specimens which were only fragments could not be identified satisfactorily.

Bathyactis Moseley.

1. *Bathyactis palifera* Alcock.

Bathyactis palifera Alcock 1902.

Stat. 204. Between islands of Wowoni and Buton, Northern entrance of Buton-strait. 2 ex.

These two specimens were found in a depth of 75—94 M.

Genus not referred to any family.

Merulina Ehrenberg.

The Siboga Expedition collected only one *Merulina*, but I was able to study sixteen other colonies from the Museum at Amsterdam and Leiden. These belong to five different species.

Up till now eight species of this genus have been described, which are still ascribed to this genus, namely: *M. ampliata* (Ellis et Sol.), *M. regalis* Dana, *M. speciosa* Dana, *M. crispa* Dana, *M. scabricula* Dana, *M. ramosa* M.-Edw. et H., *M. prolifera* Quelch, *M. studeri* Bedot.

*1. *Merulina ampliata* (Ellis et Sol.).

Madrepora ampliata Ellis et Solander 1786.
Madrepora ampliata Esper 1797.
Agaricia ampliata Lamarck 1801.
Merulina ampliata Ehrenberg 1834.
Merulina ampliata M.-Edwards et Haime 1851.
Merulina ampliata M.-Edwards et Haime 1857.
Merulina ampliata Verrill 1864.
Merulina ampliata Studer 1877.
Merulina ampliata Duncan 1886.
Merulina ampliata Ortmann 1888.
Merulina ampliata Ortmann 1889.
Merulina ampliata Gardiner 1904.
Merulina ampliata Vaughan 1918.

Singapore. 2 ex. — Amboina. LUDEKING leg. Leiden Mus. 1 ex. — Timor. WIENECKE leg. Leiden Mus. 1 ex. — Ceram. HOEDT leg. Leiden Mus. 1 ex. — Amboina. HOEDT leg. Leiden Mus. 1 ex. — Ternate. BERNSTEIN leg. Leiden Mus. 1 ex. — Billiton. 4 ex. — Locality unknown. 1 ex.

According to DANA this species is seldom clustered and the ridges are rounded. It is the latter character that chiefly distinguishes this species from *M. regalis*. VAUGHAN had photographs of the type of ELLIS and SOLANDER, in which, as VAUGHAN says, the ridges are narrow. My specimens agree in every way with VAUGHAN's figures and also with the photograph of the type specimen that VAUGHAN kindly sent me. They have not rounded ridges, as DANA says, but narrow irregular ones. My specimens as well as that of VAUGHAN are also not seldom but always and very much clustered. So I have no doubt, that my specimens belong to this species, and that the description of DANA relates to another species.

2. *Merulina vaughani* nov. nomen. (Plate V, fig. 1; Plate VI, fig. 1).

Merulina ampliata Dana 1846.

Stat. 213. Saleyer-anchorage. 1 ex.

This specimen agrees exactly with DANA's description of his *M. ampliata*, but cannot keep this name for the above mentioned reason. It differs entirely from VAUGHAN's figure of *M. ampliata* Ellis et Sol.

My specimen is cup-shaped and only incised to the bottom on one side. Some other less deep incisions are covered by the large folds into which the edge is thrown. The upperside of the colony, that is the inner side of the cup, is covered with round knops ± 10 m.M. in diameter. The bottom of the cup has died away. On the underside there are folds just as in *M. ampliata* on which there are fan-shaped lines and small spines. The wall has a few perforations near the edge, but at a distance of 5 c.M. from the edge hardly any perforations are seen.

The calicles are situated in rows between the ridges. They are obvious, for the ridges come nearer to each other on the places where no calicles are. Besides at the above mentioned knops the ridges are nearly parallel.

The breadth of the rows, measured from top to top of the ridges, can be as much as 5 m.M.; the ridges are very broad and regularly rounded.

The septo-costae go over the ridges at equal distances. They are only slightly prominent on the surface of the ridges, and often look like rows of small teeth. The inner edge of the septa often forms a paliform tooth and continues afterwards as an irregular network that occupies the place of the columella.

*3. *Merulina regalis* Dana.

Merulina regalis Dana 1846.
Merulina regalis M.-Edwards et Haime 1857.
Merulina regalis Verrill 1864.
Merulina regalis Ortmann 1888.
Merulina regalis Studer 1901.

Navigatory-islands. 1 ex. — Locality unknown 1 ex. —

These two specimens have narrow ridges just as *M. ampliata*. They agree with the description and figures of DANA.

The specimen from the Navigatory Islands consists of large broad folded lobes. Two pieces which were once broken off have become attached again at another place. One of these pieces has turned 180° sothat the inner side has become the outside.

*4. *Merulina ramosa* M.-Edw. et H.

Merulina ramosa M.-Edwards et Haime 1851.
Merulina ramosa M.-Edwards et Haime 1857.
Merulina ramosa Duncan 1886.

Locality unknown. Leiden Mus. 1 ex.

This specimen agrees with the figure and the description, which M.-Edwards and Haime give of this species.

*5. *Merulina studeri* Bedot.

Merulina studeri Bedot 1907.

Singapore. 1 ex.

Just like Bedot's my specimen is characterised by the possession of blunt, knob-shaped protrusions. The diameter of these protrusions can be as much as 4 c.M. While the ridges on the flat part of the colony run regularly and straight, they make irregular bends on the protrusions. The ridges are narrow; the distance between the tops of the ridges can be as great as 6 m.M. Just as in Bedot's specimen the septa have few teeth or none at all. My specimen differs from Bedot's in its striking high ridges, for while Bedot's are 3 m.M. high at the maximum, mine attain a height of 5 m.M.

This difference, however, does not justify a specific separation in my opinion.

Bedot supposes that his specimen was attached originally by a stalk but that it was wholly detached later on, just as a *Fungia*. In my specimen it appears clearly that this supposition of Bedot is right. I can recognize distinctly the area by which the colony was attached originally, but at present there are sponges on this place, together with small Balanids and young corals, from all of which it appears that the colony was free during the last part of its life.

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EXPLANATION OF PLATES.

PLATE I.

Fig. 1. *Fungia patella* (Ellis et Sol.). Nat. size.
Fig. 2. *Fungia somervillei* Gardiner. Nat. size.
Fig. 3. *Fungia sibogae* nov. spec., under surface. Nat. size.
Fig. 4. *Fungia sibogae* nov. spec., upper surface. Nat. size.
Fig. 5. *Fungia weberi* nov. spec., upper surface. Nat. size.
Fig. 6. *Fungia weberi* nov. spec., under surface. Nat. size.
Fig. 7. *Fungia echinata* (Pallas) var. *parvispina* Död., part of under surface. Nat. size.
Fig. 8. *Fungia granulosa* Klunzinger, upper surface. Nat. size.

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PLATE II.

Fig. 1. *Fungia moluccensis* v. d. Horst, under surface. Nat. size.
Fig. 2. *Fungia moluccensis* v. d. Horst, upper surface. Nat. size.
Fig. 3. *Psammocora nierstraszi* nov. spec. Nat. size.
Fig. 4. *Psammocora nierstraszi* nov. spec., part of colony. × 3.
Fig. 5. *Fungia cyclolites* Lam., under surface slightly enlarged.
Fig. 6. *Fungia adrianae* nov. spec., upper surface. Nat. size.
Fig. 7. *Fungia adrianae* nov. spec., under surface. Nat. size.

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PLATE III.

Fig. 1. *Halomitra louwinae* nov. spec., under surface. × $^2/_3$.
Fig. 2. *Halomitra louwinae* nov. spec., upper surface. × $^2/_3$.
Fig. 3. *Döderleinia sluiteri* nov. spec., under surface. × $^1/_2$.
Fig. 4. *Döderleinia sluiteri* nov. spec., upper surface. × $^1/_2$.
Fig. 5. *Pavona diffluens* (Lam.). × $2^1/_3$.
Fig. 6. *Pachyseris involuta* Studer. Nat. size.

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PLATE IV.

Fig. 1. *Döderleinia robusta* (Quelch), upper surface. Nat. size.
Fig. 2. *Döderleinia irregularis* Gardiner, upper surface. Nat. size.
Fig. 3. *Pachyseris rugosa* (Lam.). × 2.
Fig. 4. *Podabacia involuta* nov. spec., upper surface of lobe. × 2.
Fig. 5. *Podabacia lobata* nov. spec., under surface. × $1^{3}/_{4}$.
Fig. 6. *Podabacia elegans* (M.-Edw. et H.). × $^{2}/_{3}$.
Fig. 7. *Podabacia elegans* (M.-Edw. et H.), part of a lobe, upper surface. × $1^{1}/_{2}$.
Fig. 8. *Podabacia elegans* (M.-Edw. et H.), under surface. × 2.

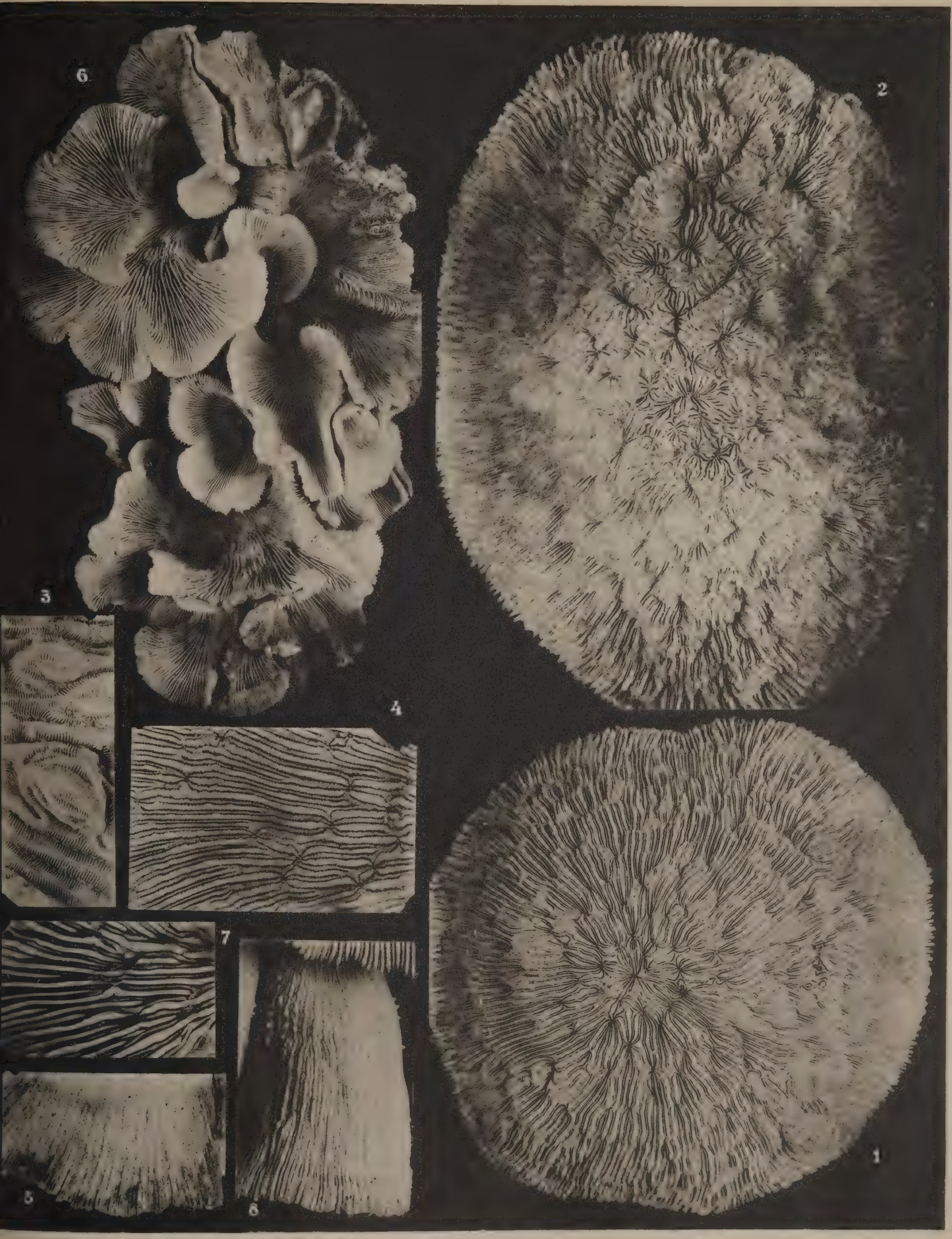
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PLATE V.

Fig. 1. *Merulina vaughani* nov. nomen. × $1^1/_4$.
Fig. 2. *Pachyseris valenciennesi* M.-Edw. et H. × $^1/_2$.
Fig. 3. *Pachyseris carinata* Brüggemann. Nat. size.
Fig. 4. *Podabacia involuta* nov. spec., upper surface of central part. × $1^2/_3$.
Fig. 5. *Podabacia involuta* nov. spec., under surface. × 2.
Fig. 6. *Podabacia dispar* Verrill. Nat. size.
Fig. 7. *Leptoseris papyracea* (Dana). Nat. size.
Fig. 8. *Leptoseris tubulifera* Vaughan. Nat. size.
Fig. 9. *Leptoseris tenuis* nov. spec. Nat. size.
Fig. 10. *Leptoseris tenuis* nov. spec. × $2^2/_3$.
Fig. 11. *Siderastrea savignyana* M.-Edw. et H. Nat. size.

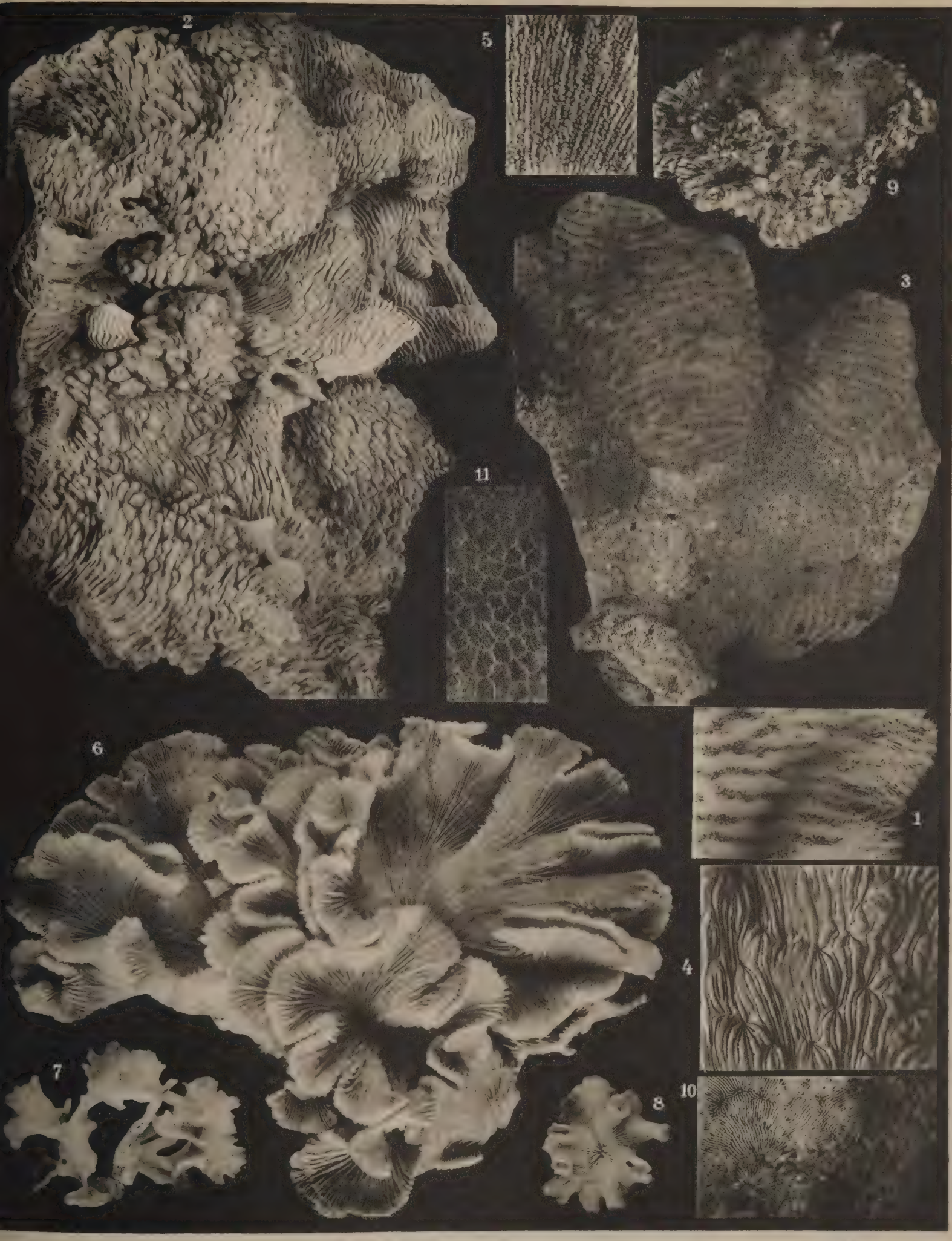
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PLATE VI.

Fig. 1. *Merulina vaughani* nov. nomen.
Fig. 2. *Pachyseris rugosa* (Lam.). Nat. size.
Fig. 3. *Podabacia involuta* nov. spec. × $^1/_2$.
Fig. 4. *Podabacia lobata* nov. spec. × $^3/_4$.

HELIOTYPIE, VAN LEER AMSTERDAM.